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DIAGNOSIS AND TREATMENT
OF
DISEASES OF WOMEN

DIAGNOSIS AND TREATMENT

OF

DISEASES OF WOMEN

BY

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Medical Society of City Hospital Alumni, etc.

THIRD EDITION.

WITH SEVEN HUNDRED AND FORTY-FOUR ENGRAVINGS

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TO THE MEMORY OF

DR. HENRY HODGEN MUDD

THIS WORK IS RESPECTFULLY

DEDICATED

AS A SLIGHT TOKEN OF APPRECIATION

OF

HIS SPLENDID PROFESSIONAL ATTAINMENTS,

HIS UNSELFISH DEVOTION TO THE CAUSE OF MEDICAL EDUCATION

AND HIS INSPIRING PERSONAL FRIENDSHIP

86009

PREFACE TO THE THIRD EDITION.

The scope of this work is fully set forth in the previous editions. The method of presentation has proven so satisfactory that no change is indicated. Serologic diagnosis and treatment, as applicable in gynecologic work, has received consideration. The treatment of inoperable cases of severe uterine prolapse and cystocele, has been given special attention and a number of new drawings have been made to elucidate the action of the most effective pessaries for this condition. New facts have been added under a number of other topics. The new illustrations are by Mr. Ivan F. Summers, whose patience and skill I much appreciate.

H. S. CROSSEN.

METROPOLITAN BUILDING,
ST. LOUIS, July, 1913.

PREFACE TO THE SECOND EDITION.

The character of this work is indicated in the extract from the preface to the first edition. My endeavor has been to present clearly and in detail the foundation facts and principles of Gynecology—the anatomic, pathologic, diagnostic and therapeutic information underlying successful gynecologic work.

Two hundred pages of text and fifty original illustrations have been added. The index, upon which the practical usefulness of a medical book so largely depends, has been greatly amplified, so as to include references and cross-references to every diagnostic and therapeutic item. In the new text special attention has been given to the presentation of pelvic inflammation and of tubal pregnancy—two live and important subjects, upon each of which an enormous and chaotic mass of information has accumulated. To properly emphasize the established landmarks and point out important features of advance work—such was the task. Disturbances of function merit, and have received, careful and detailed consideration, both from the diagnostic and therapeutic standpoint. Medico-legal complications are claiming more and more attention each year, and those connected with gynecology are considered in a detailed and practical way.

My thanks are due to Mr. Thos. Jones, the artist, for the careful work shown in the new drawings.

I would appear remiss in gratitude did I not express my appreciation of the gratifying reception accorded the first edition by teachers and practitioners.

H. S. CROSSEN.

METROPOLITAN BUILDING,
ST. LOUIS, September, 1910.

EXTRACT FROM PREFACE TO THE FIRST EDITION.

This work is devoted exclusively to the DIAGNOSIS and TREATMENT of Diseases of Women as those diseases are met with in the office and at the bedside by the general practitioner. No space is given to other considerations, except as necessary to bring the work to its highest usefulness as a practical guide in the lines indicated. While no space is taken up with detailed technical descriptions of major operations, much care is taken to set forth clearly the differential diagnosis of the various conditions requiring such operative treatment, the kind of operation called for by the particular conditions present, what the operation is intended to accomplish, the preparation of the patient for operation and the after-care necessary to complete the restoration to health.

In my experience as a consultant and as a teacher I find that the two principal stumbling-blocks encountered in the way of accurate gynecologic work are, first, the difficulty of determining exactly the conditions present in the pelvis, and, second, the lack of a clear understanding of the indications governing the selection of the particular treatment best adapted to each of the various classes of cases under each disease. Special consideration is given to these important phases of the subject.

My endeavor throughout has been to present the important points CLEARLY and SYSTEMATICALLY—so clearly and so systematically that they will be readily understood and well retained in mind for use at the bedside. To this end much thought has been given to the ARRANGEMENT OF THE TEXT, so as to show not only the facts of a subject, but also the mutual relation of the facts and their bearing and relative importance in the diagnosis and treatment. The necessary facts are presented clearly and fully, and UNINCUMBERED by the vast and confusing mass of gynecological knowledge with which the specialist must deal.

To this end, likewise, the ILLUSTRATIONS have been most carefully selected, with the one idea of making clear the points under consideration. From the extensive field of gynecological literature I have endeavored to bring the BEST illustration available to elucidate each point. Those from reference works necessarily cover a wide range, and I wish here to express my hearty thanks to the authors and publishers of the works so used.

I have added over two hundred and twenty illustrations of my own. In these I have endeavored particularly to show the actual care and handling of the patients, thus bringing to those who have not had the opportunity of necological hospital training many facts which can be satisfactorily pre- d in no other way. For this purpose I have had taken over five hundred photographs. Only a part of them, however, could be used in this work on account of limited space. Most of these photographs were taken by my clinical assistant, Dr. R. E. Wobus, to whose skill and patience I bear appreciative tribute.

My thanks are due to my colleague, Dr. Henry Schwarz, Professor of Obstetrics in Washington University, for helpful suggestions.

I wish to thank Dr. F. J. Taussig and Dr. H. A. Hanser, my Senior Clinical Assistants, for valuable help in various ways.

To Dr. R. W. Mills, the artist, I wish to express my appreciation. His painstaking care and fidelity in representation are apparent in all the drawings made by him.

For engravings of instruments I am indebted to Mr. C. W. Alban, instrument dealer, of this city.

The publishers have aided me throughout by their courtesy and cordial co-operation, for which I wish to express my sincere thanks.

H. S. CROSSEN.

ST. LOUIS, May, 1907.

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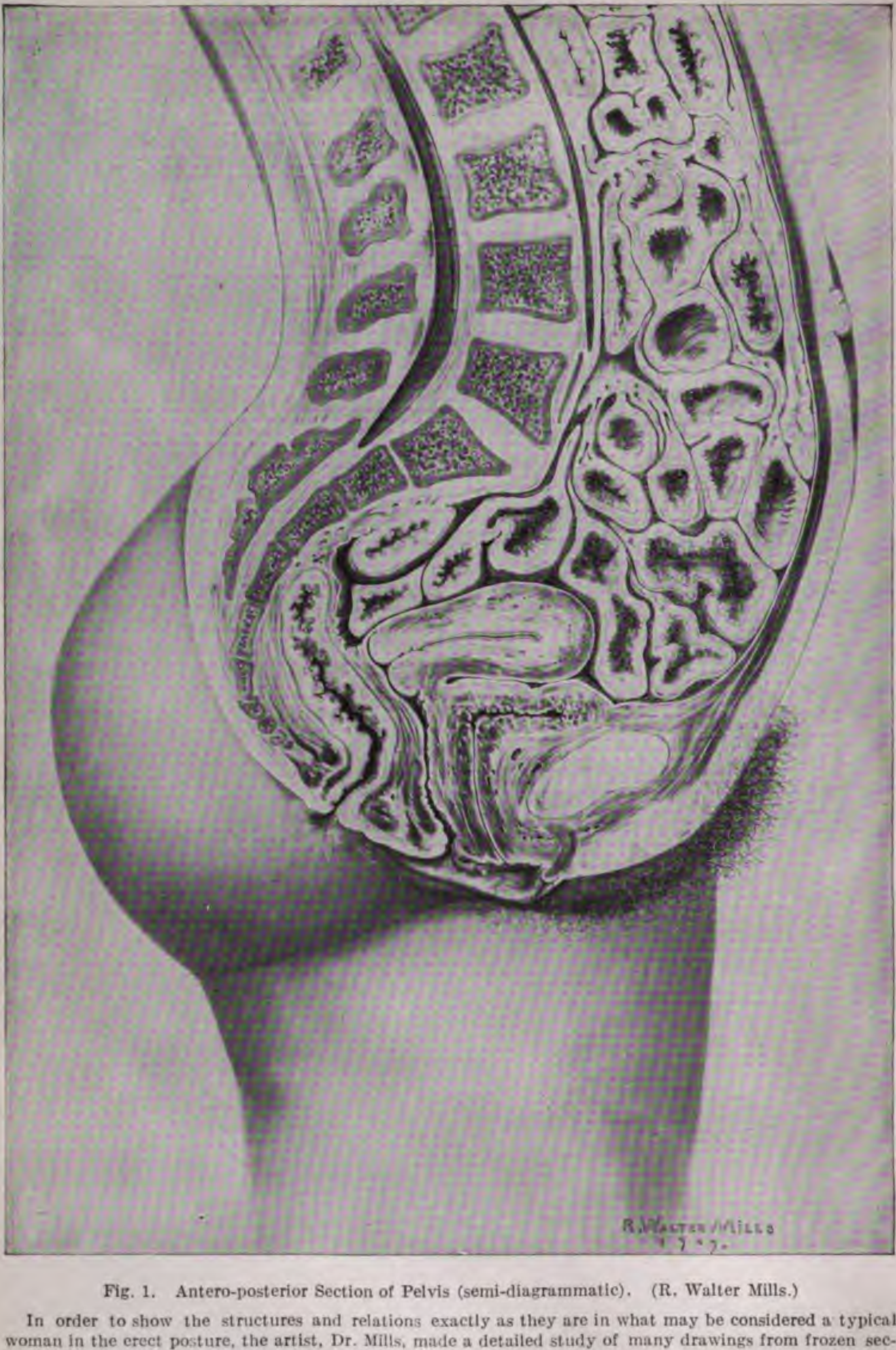


Fig. 1. Antero-posterior Section of Pelvis (semi-diagrammatic). (R. Walter Mills.)

In order to show the structures and relations exactly as they are in what may be considered a typical woman in the erect posture, the artist, Dr. Mills, made a detailed study of many drawings from frozen sections for the internal relations, and of several well-formed women in the normal standing posture for the contour and external relations. This gave a result differing considerably from the usual representation of a patient standing, made by taking a drawing of a section of a flattened cadaver and turning it upright. The lumbar curve is more marked, the lower abdominal wall and the buttocks are more prominent and there is a change of the relations of the internal organs to the external landmarks.

For the internal relations the admirable frozen sections of Sellheim were principally followed, and the exactness with which the pelvis and contents of the actual sections fitted into the contours of the living models was most pleasing and instructive.

DISEASES OF WOMEN.

CHAPTER I.

GYNECOLOGICAL EXAMINATION METHODS.

The physician who wishes to do accurate work in diagnosis must be in possession of certain facts, as follows:

Knowledge of the anatomy and physiology of the organs involved.
Reliable history and examination of the patient.
Knowledge of the diseases to which the parts are liable.

The essential organs in the group of structures involved in gynecological* diseases are shown in Figs. 1, 3, 4, 5 and 6. They are as follows:

1. The **ovaries**, in which the ova are formed.
2. The **Fallopian tubes**, which conduct the ova from the ovaries to the uterus.
3. The **uterus**, which receives and nourishes the fertilized ovum and expels the fetus at term.
4. The **vagina**, which is the connecting link between the uterus and the outside world.

There are also several accessory structures—namely, the external genitals, the perineum, the pelvic floor, the pelvic peritoneum and the pelvic connective tissue.

The gross anatomy of these organs and the prominent facts in their physiology are sufficiently known to you, from general anatomical and physiological study, to permit immediate consideration of the methods of obtaining the facts on which a diagnosis may be based.

HISTORY.

When called to see a patient with pelvic disease, the first thing to do is to obtain what information the patient can give concerning her trouble. This information, obtained from the patient or her friends, is called the history, and should include facts covering the points mentioned below.

---

* As to the pronunciation of "gynecology," the weight of authority is decidedly in favor of soft g, short y and the accent on the third syllable—jin e kol′ o je (Webster's Unabridged Dictionary, Century Dictionary, Dictionary, Gould's Medical Dictionary, Keating's Medical Dictionary). A few authorities differ, d long y, and others favoring hard g and long y.

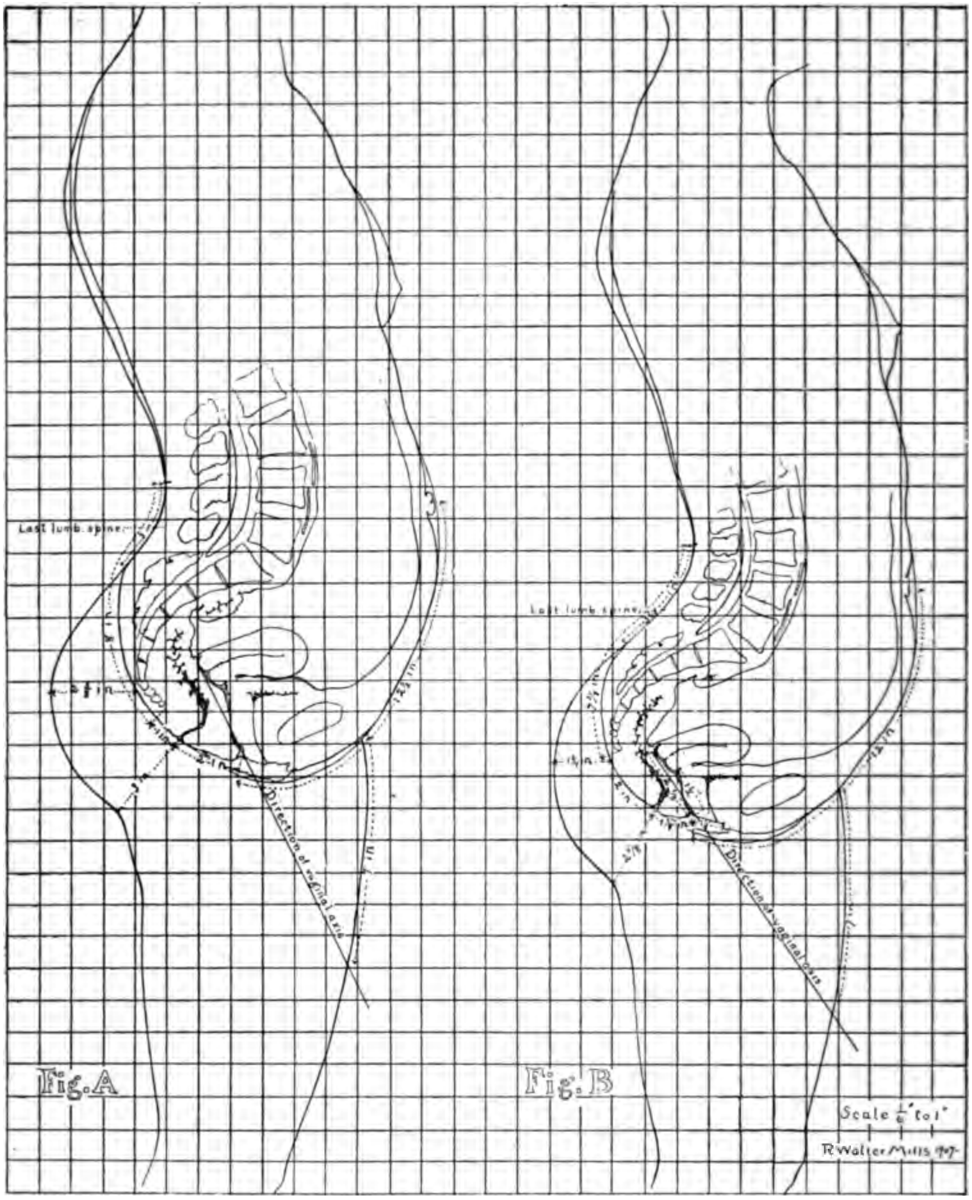

Last lumb. spine
Direction of vaginal axis
Fig. A
Last lumb. spine
Direction of vaginal axis
Fig. B
Scale $\frac{1}{6}$" to 1"
R Walter Mills 1907

Fig. 2. A. Exact Contour and Measurements of the woman selected for Fig. 1. B. Exact Contour and Measurements of another model, presenting a more pronounced lumbar and abdominal curve. The small squares represent one-inch squares at life size. (R. Walter Mills.)

(A) Artist's model, aged 28, mother of two children (6 and 8 years old respectively), has worn corset practically none, is in good health and fairly muscular. Height 5 ft. 7 in., weight 140 lbs., bust measure 36 in., waist 27 in. (2 in. above umbilicus), circumference at umbilicus 30 in., hips 39 in., thigh 22½ in. (2 in. below gluteal crease), antero-posterior diameter of body at waist 6¼ in., antero-posterior diameter of thigh (2 in. below gluteal crease) 6⅝ in. The other data are given on the outline. To conform to the so-called "perfect form" the hips should be a trifle larger and the weight somewhat more.

(B) Young woman, aged 27, never pregnant, has worn corset very little, is in good health and muscular. Height 5 ft. 4 in.; weight 114 lbs., bust measure 32 in., waist 24 in. (2 in. above umbilicus), hips 38 in., thigh 22 in. (2 inches below gluteal crease), antero-posterior diameter of body at waist 6½ in., antero-posterior diameter of thigh (2 inches below gluteal crease) 6⅜ in. The other data are given on the outline. The lumbar and abdominal curves are more pronounced than in (A).

The numerous exact measurements given in Fig 2 constitute val[illegible] data to guide in medical drawings of this character.

Present Symptoms.

Of what symptoms does the patient complain? A question directed to bring out this information will at once enlist the patient's interest and relieve any temporary embarrassment she may feel. The prominent symptoms are soon given and serve to indicate lines of special inquiry when taking the systematic history of the case.

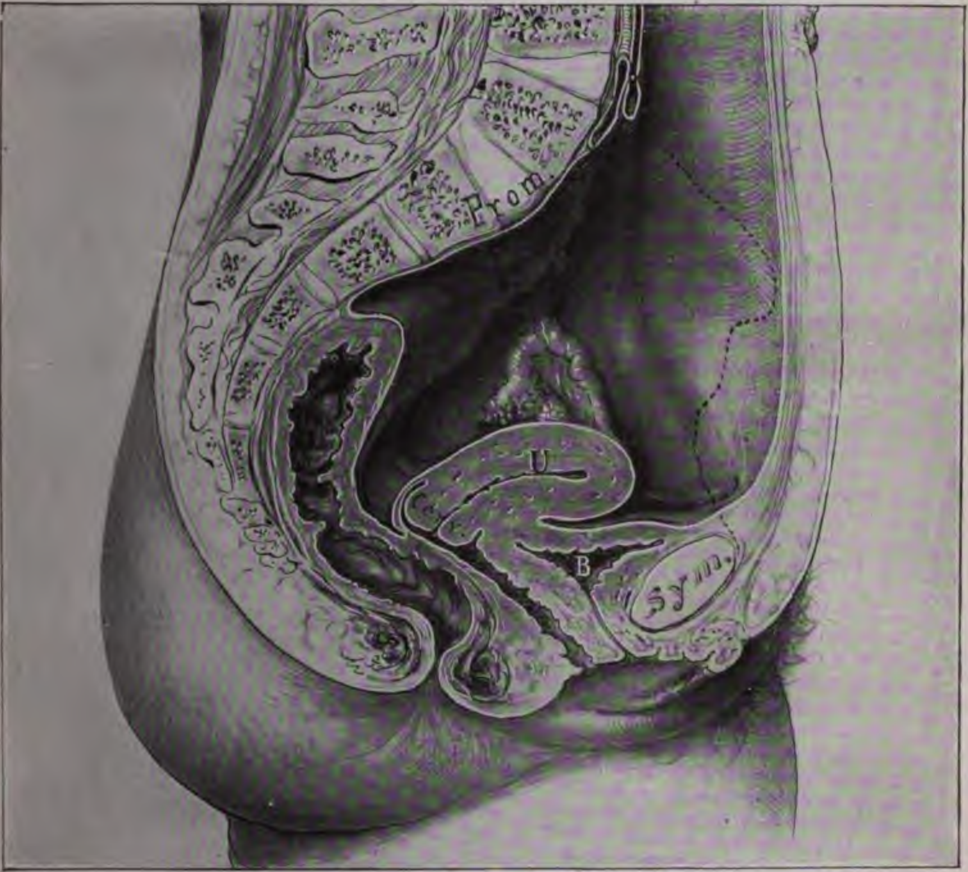


Fig. 3. Antero-posterior Section of Pelvis. Showing left half of body, with intestines removed. (Kelly—*Operative Gynecology*.)

The systematic inquiry is begun at some convenient point in the patient's narrative.

Beginning of Present Trouble.

How long has the patient been sick? Ascertain accurately when the present trouble began. If it is of long duration, pass back of the several exacerbations get the approximate date of the first acute attack or first appearance of d symptoms.

What were these first symptoms? How severe were they? What was done for them?

What caused the trouble at that time? Had there been a severe sick spell or an injury of any kind? Had there been a labor or miscarriage, or menstrual disturbance or recent marriage, or extra work or anything that might have acted as a cause?

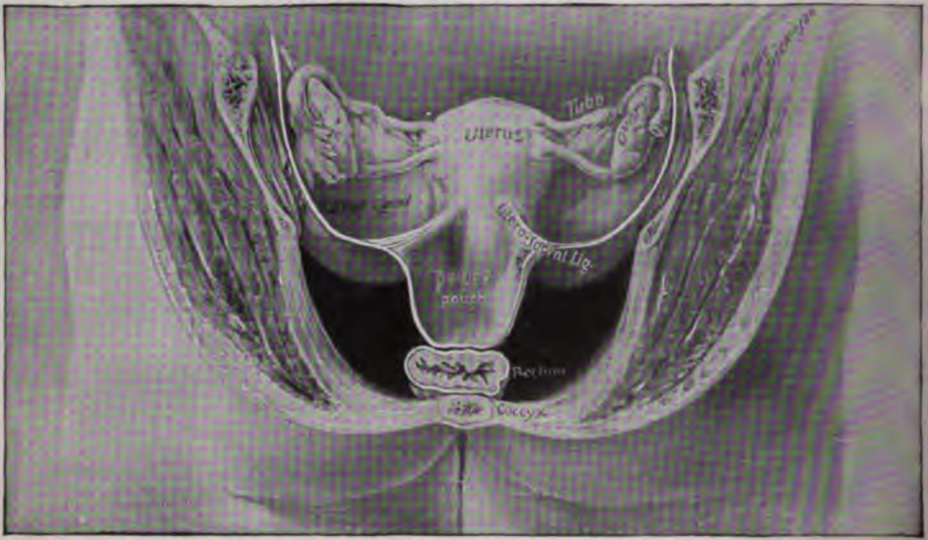


Fig. 4. View of Pelvic Organs from Behind. (Dickinson—*American Text-Book of Obstetrics.*)

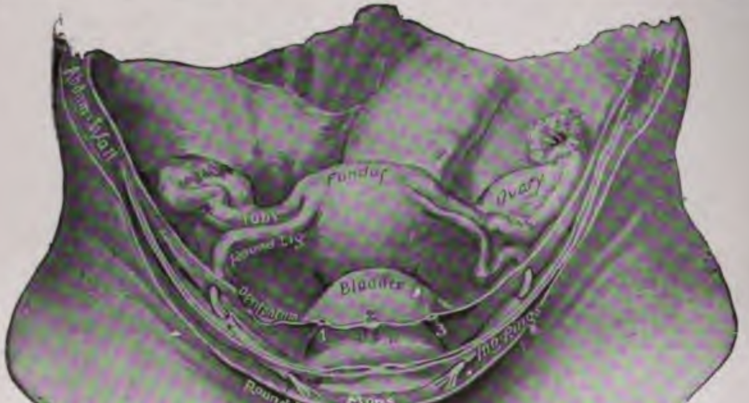


Fig. 5. Pelvic Organs from in Front. (Dickinson—*Am. Text-Book of Obstetrics.*)

Character and Duration of Principal Symptoms.

Get an account of the present trouble from the day it began, down through all the important changes, to the date of consultation. This does not mean to waste time with a mass of unnecessary detail, but to ascertain, by well-directed inquiries, the order of development and the duration of the principal symptoms, such as pain, fever, swelling, discharge, etc.

Locate definitely the site of the pain or tenderness or other distress complained of. Is it in the tubal region or appendix region, or over the uterus or about the ureter or kidney? Have the patient point out the exact location of the pain. Figs. 7 to 15 indicate the location of the pain in various affections. This definite localization helps to clarify the situation and makes the patient more careful and reliable in her statements.

Of course no diagnosis should be attempted from such necessarily uncertain localization by the patient. This simply indicates what group of organs are probably affected and thus enables the physician to question the patient more definitely and accurately before beginning the physical examination.

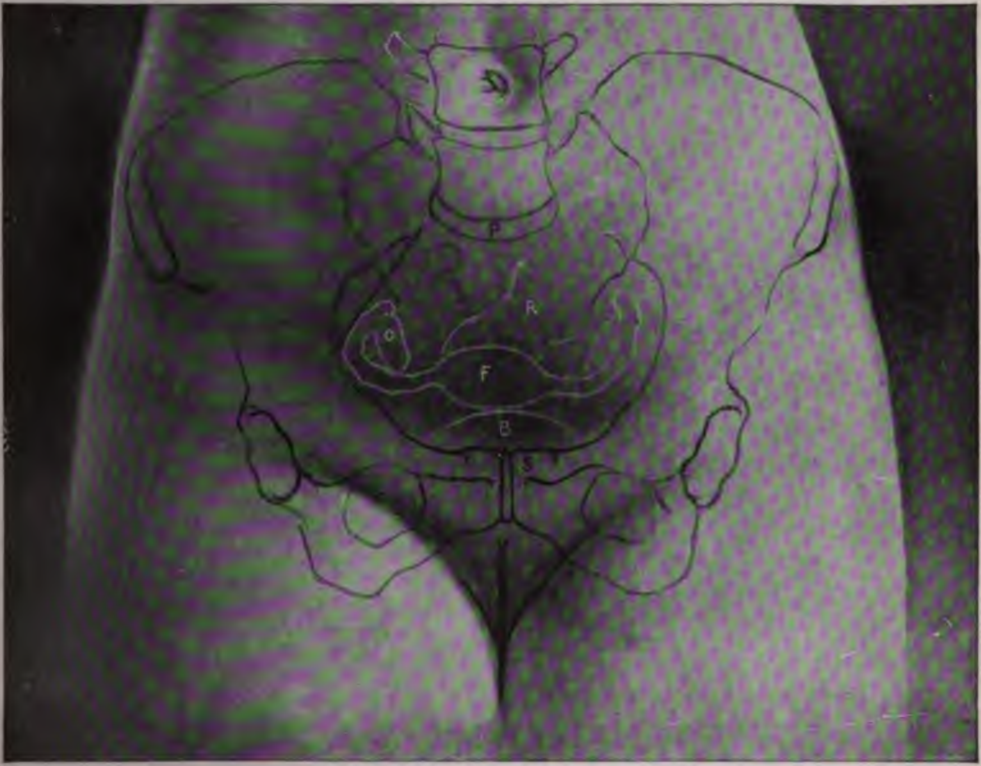


Fig. 6. Relation of the Pelvic Organs to the External Surface of the body. (Dickinson—*Am. Text-Book of Obstetrics.*)

Ascertain also the effect of the disease on the general health. As to this effect, we have two guides—the weight and the activity of the patient. How much has she lost in weight, or has she gained? How much of the time has she been confined to bed? If able to be up and about part of the time, or all of the time, how much work or walking or shopping has she been able to do?

Ascertain also the frequency and duration of the exacerbations of the disease. Has the trouble been getting worse gradually and continuously, or have there been exacerbations, followed by remissions, with partial or complete disappearance of the symptoms?

Inquire also concerning complications. Frequently there are complicating bladder or rectal disturbances or other associated local diseases, and the extent of these should be determined.

Previous Health.

Has the patient previously been well and strong? Any serious sickness, whether connected with the pelvic organs or not, should be inquired into. It may be an important factor in the origin of the present disturbance or it may point to some complication that must be taken into consideration in the treatment.

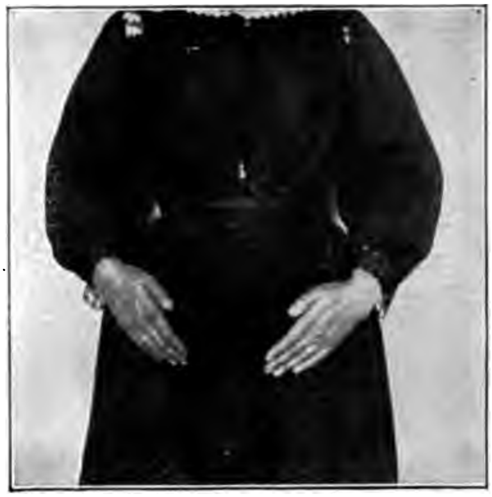


Fig. 7. Indicating General Pelvic Distress. This distress may be due to bladder or uterine or tubal or ovarian disease on one or both sides.

Age, Married, Address, Occupation.

This stage of the conversation is a convenient time to note the necessary facts not strictly medical. You may now ask the patient her age, occupation, etc., without the questions appearing irrelevant.

If married, how long? If she has been married more than once or if she is a widow, she will probably mention the fact and also any correlated facts bearing on the present disturbance.

The securing of the patient's address comes in very well here. Also other similar items of information that it may, for business reasons, be advisable to note in some cases—for example, the husband's occupation and business address.

Is the patient engaged in any work aside from her household duties? If so, what is it and has it any bearing on the origin or continuation of the present trouble? Does she do any of her housework? If so, how much? Is it executed with facility, as when she was well, or is there pain and disability? Ascertain accurately the character of the distress associated with the work. What time of day does it come on, where is it located, is it a sharp pain or a dull aching, or a dragging weight and pressure? What posture aggravates or relieves it, does it necessitate lying down, does it recur soon after rising, is it present every day, does it vary from week to week or from month to month?

Confinements.

Has the patient had children? If so, how many and when? Was there serious trouble during any labor or during any pregnancy or afterward? Make particular inquiry as to whether the labor was so severe that instruments had to be used, or whether the labor was followed by indications of sepsis or of laceration of the pelvic floor or cervix uteri.

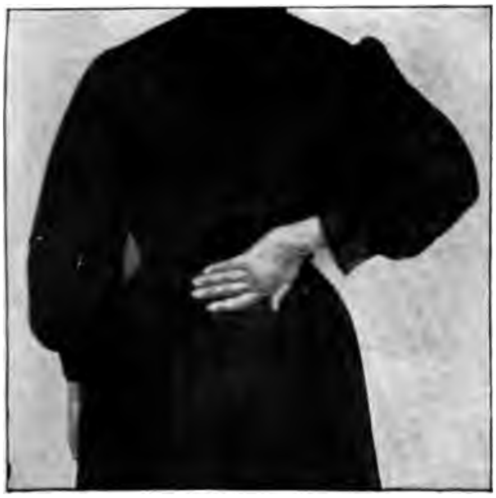


Fig. 8. Backache from pelvic disease. Indicating pain in the central lumbar region.

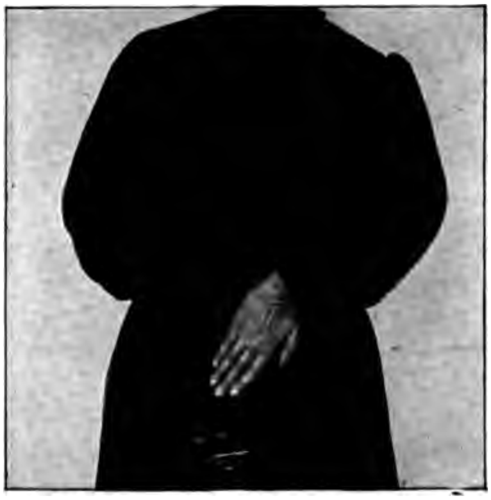


Fig. 9. Backache from pelvic disease. Indicating pain extending down over the sacrum.

If after any labor the patient was sick in bed for two or three weeks, with pain in the lower abdomen and fever, she probably had sepsis in some form, the usual form being septic endometritis. Another very common history of mild sepsis is that the patient gets up as usual, but does not feel strong, and after a few days takes a "backset," and returns to bed or drags about the house with soreness in the lower abdomen, some fever and marked weakness. Of course, delays in convalescence after labor may be caused by complications outside the genital tract, but generally they are due to some trouble in the genital tract, such as infection of the uterus or subinvolution of the uterus or laceration of the pelvic floor.

Miscarriages.

Have there been any miscarriages? If so, **how many and when, and at what stage of pregnancy** did each occur?

What was the cause of each miscarriage? Did it follow some **accident or was it due to some acute disease, such as typhoid fever or pneumonia? If there have been repeated miscarriages,** inquire carefully and **circumspectly as to evidences of syphilis.** Have the miscarriages been brought about **intentionally** (criminal abortion)—if so, in what way?

Was each miscarriage **complete** and **no trouble following? When incomplete,** part of the fetal membranes are retained in the uterus and cause **a persistent** bloody discharge. Sepsis also may occur.

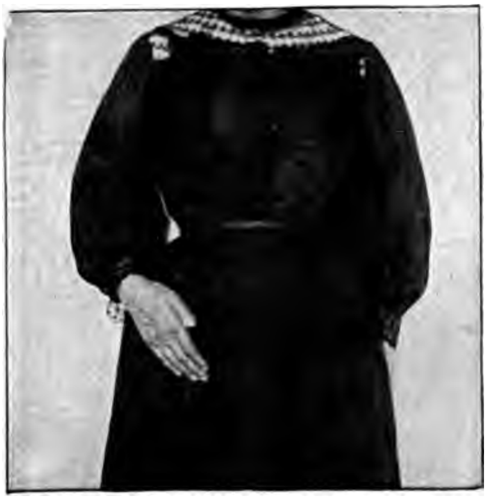


Fig. 10. Indicating pain in right tubo-ovarian region.

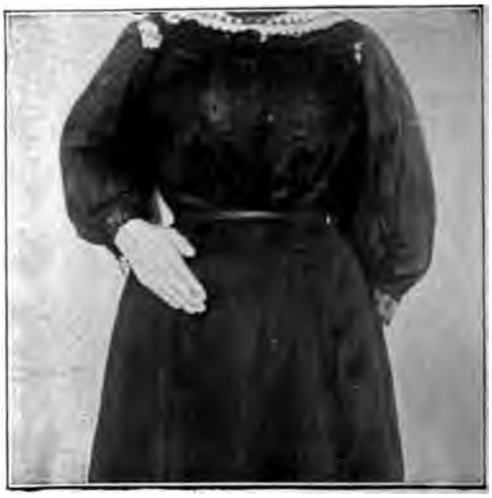


Fig. 11. Indicating pain in the appendiceal region.

Sterility.

When the patient has been married a long time and there has been no pregnancy, it is well in some cases to inquire as to why there has been no pregnancy.

Menstrual History.

How old was the patient when she **began** to menstruate? Has the menstruation been regular and of proper **duration** and **amount,** and free from severe **pain?** If there have been menstrual disturbances—for example, absence of the menses or excessive menstruation, or irregular menstruation or inter-menstrual bleeding—ascertain the duration and severity of each.

Last Menstruation.

Invariably ascertain the **date** and **duration** of the last menstruation, that pregnancy may be excluded.

Disturbances of Other Organs.

Inquiry should be made as to indications of diseases in remote organs, either complications of the pelvic trouble or intercurrent diseases.

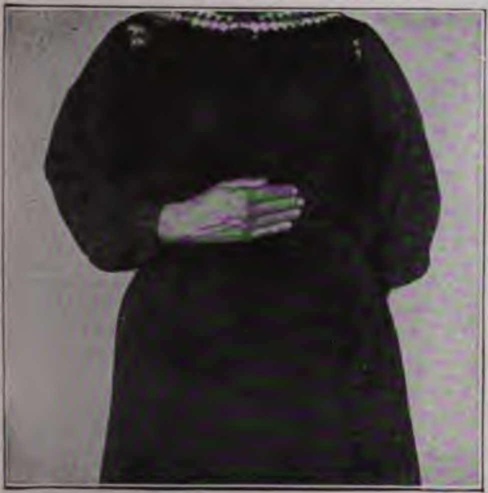


Fig. 12. Indicating pain in the region of the stomach.

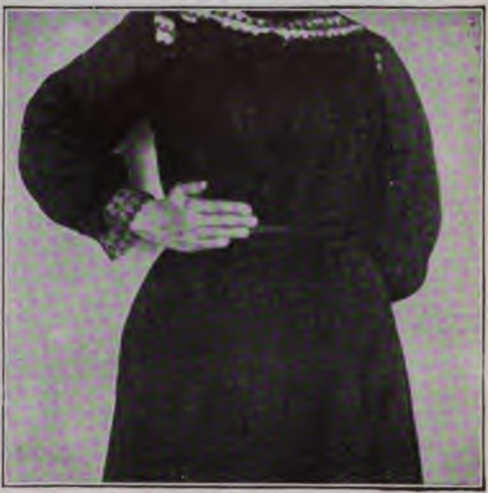


Fig. 13. Indicating pain in the liver.

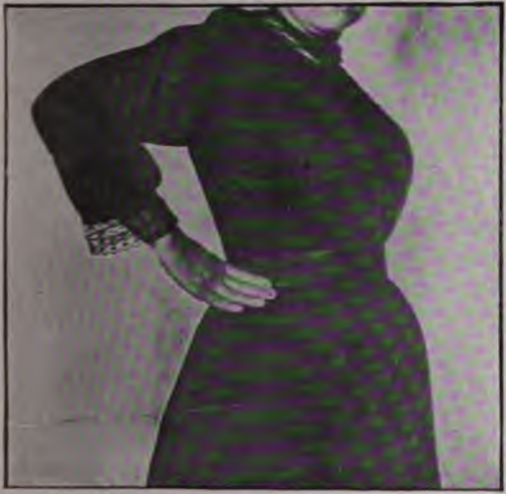


Fig. 14. Indicating pain in the region of the right kidney.

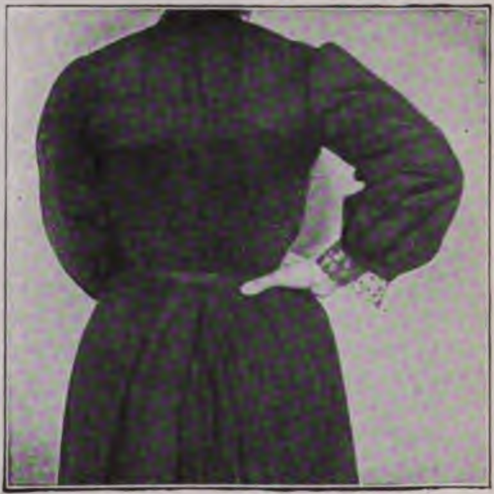


Fig. 15. Another common way of indicating the dragging pain that accompanies disease and displacement of the kidney.

If the patient gives any symptoms pointing to disease of remote organs—for example, of the heart or lungs or gastro-intestinal tract—those organs **should be examined.** In case of serious disease, and in all cases where an anesthetic is to be given, an examination of the heart and lungs and abdominal viscera is imperative.

The condition of the patient's blood, as indicated by her color, and the condition of the nervous system, as indicated by her appearance and actions, should be considered, and, if there is evidence of disease in either direction, further investigation should be carried out.

The urine should be examined if the patient is seriously sick or if there are symptoms pointing to bladder or kidney disease, or if an anesthetic is to be given.

Previous Treatment.

Question the patient as to the **character** and **duration** of the previous treatment and its apparent **effect**. Was it internal treatment only or local treatment at home (douches, vaginal suppositories or tablets or tampon-capsules), or local treatment at office (vaginal applications, tampons, intra-uterine treatment), or operation (curetment, repair of pelvic floor or cervix, vaginal section or abdominal section)?

Special Points.

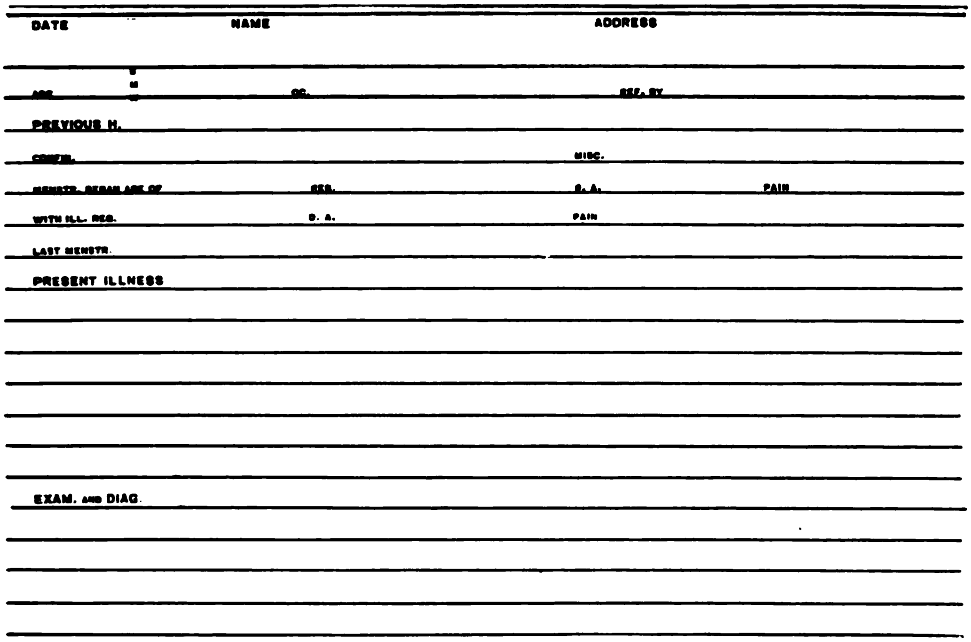
Each of the above mentioned points should be inquired into in practically every case of pelvic disease. In exceptional cases it is necessary to make inquiry along special lines—for example, in regard to the patient's family history (nervous diseases, tuberculosis, cancer), or, as in sterility, in regard to the husband's health.

Summary of Chief Symptoms Demanding Relief.

After completing the history and before beginning the examination, fix in mind the chief symptoms for which the patient seeks relief. Keep these in mind while making the examination and endeavor to find the lesion or condition that causes each of them. These symptoms serve to indicate the directions for special investigation. The diagnosis should be made, to a considerable extent, as the examination progresses. Before finishing the examination you should know whether or not you have found the cause or causes of the symptoms that brought the patient to you.

Keep a Record.

As to whether or not a record is kept, and, if so, in what way, depends of course on the inclination of the physician. However, if he does not keep a record of cases, he deprives himself of something valuable. A short record, giving in a systematic way the principal facts of a case, may be made quickly and more than repays for the time consumed. And the principal advantage is not the permanent record it gives for **reference** after some years (though this is important, especially to the teacher), but the fact that it systematizes and steadies and **improves the physician's work** day by day. Such an account of the case in black and white, referred to frequently, as the patient returns for treatment, is a constant stimulus to accurate diagnosis and a constant help in the treatment, particularly if the case is a long continued one. Again, in court the physician is supposed to have some record of his work. You may at any time be **called upon to testify** as to the exact findings in the case of some patient whom you saw one or two or three years before.



DATE NAME ADDRESS

AGE S M W OC. REF. BY

PREVIOUS H.

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MENSTR. BEGAN AGE OF REG. D. A. PAIN

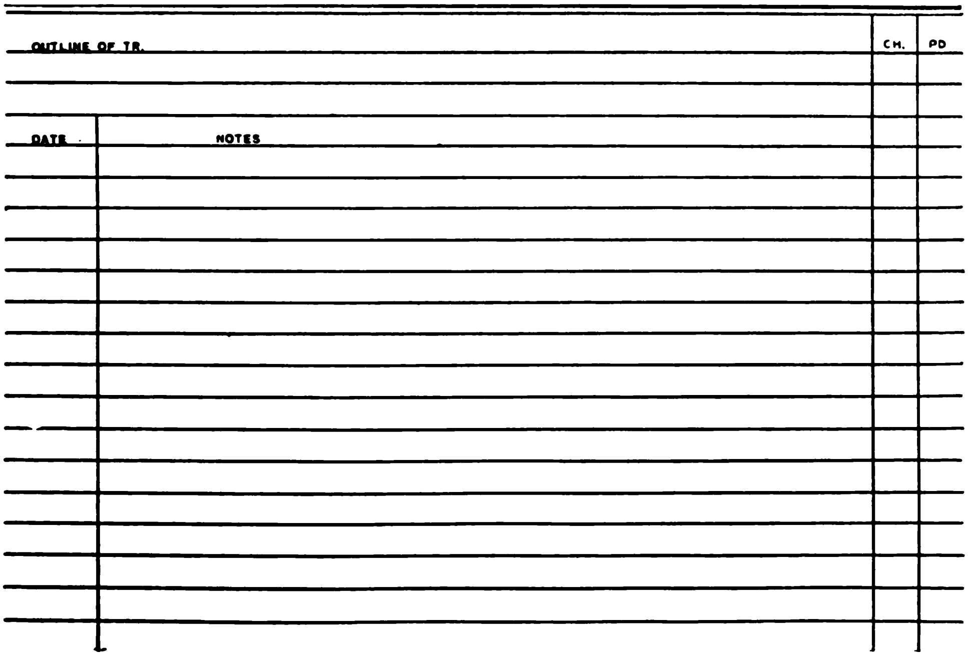
WITH ILL. REG. D. A. PAIN

LAST MENSTR.

PRESENT ILLNESS

EXAM. AND DIAG.

Fig. 16. Gynecological History Card. The original card is 6 in. wide and 4 in. high.



OUTLINE OF TR. CH. PD

DATE NOTES

Fig. 17. Reverse side of History Card.

The record should embody the important facts in the history, in the examination findings, in the treatment given, and in the subsequent progress of the case. The great drawback to records is the time required to make them. In order to make them at all, the physician must have some arrangement by which the record may be made in a very few minutes. Here comes in the utility of printed forms. On a printed form the physician may, in a few minutes, put down the notes necessary to make an accurate account of the case.

Record cards, printed as desired, and arranged as a card-index, constitute the most convenient record system for the busy practitioner, and at a moderate cost.

I use 4x6 cards, printed on one side for the principal record (Fig. 16), the back of the card being used for extra notes (Fig. 17). When more space is required, blank cards are attached as needed.

When it is desired to have a sketch of the condition, a small outline of the pelvis or abdomen is stamped at some clear space on the card with the required rubber stamp (of which any desired kinds may be obtained at small expense), and the tumor or inflammatory mass, or displaced organ is then drawn in.

I use three kinds of form-cards, all the same size, but differing in color. For the gynecological cases I use a white card and for the obstetrical cases a salmon card. For the obstetrical drawer there are two sets of monthly index cards, one blue and the other manila. When the obstetrical patient first comes, the clinical notes are made as to last menstruation, any disturbances, time for regular examination, etc., and the card is placed under the blue index card for the month of examination. So by a glance I can tell just what patients are awaiting examination each month. When the examination is made, the findings are noted and the card is then placed under the manila index for the month of delivery. After labor the card is finally noted up and placed in the general card-index of patients, that it may be readily referred to at any time. My operation cards are of the same size, but a different color, so that they also may be easily distinguished from the other cards of the general index.

If one does not wish to invest in specially prepared cards and holders, a start may be made with some blank cards of the desired size, arranged upright in the ordinary desk drawer.

Is a Pelvic Examination Required?

After obtaining all the information the patient can give concerning her illness, the next step is to make the physical examination, provided there are symptoms making such an examination necessary.

In the case of a **virgin**, pelvic examination is rarely indicated until after general therapeutic measures have been tried and have failed to give relief. Occasionally a young woman or a girl will present such serious symptoms that an examination is indicated at the first visit, but such cases are extremely rare.

On the other hand, in the case of a **married woman**, if decided pelvic symptoms are present, an examination should as a rule be made at once, particularly if there has been previous treatment without satisfactory result.

In such a case, when the patient's account of the trouble is finished, say to her that an examination is necessary in order to determine the exact condition present.

Usually the patient was aware that an examination would be necessary and came for that purpose. If not, she may make some slight protest, which may be waived aside. If she expresses a decided preference for another time, an appointment may be made for some other day. If the patient is **menstruating**, the examination is of course postponed, unless the symptoms are very serious and urgent. A non-menstrual bloody discharge is not a contraindication to examination, but rather an additional indication for it.

If the patient is extremely anxious to avoid the examination, treatment without it may be tried for a while in a suitable case, even though immediate examination seems decidedly preferable.

When a girl is examined, her mother or some other relative should be present.

PHYSICAL EXAMINATION.

The **order** of examination which I find most convenient, when the patient can be placed on the table, is as follows:

Abdominal examination.
Inspection of external genitals, meatus, perineum, etc.
Vaginal examination (digital).
Vagino-abdominal examination (bimanual).
Instrumental examination.

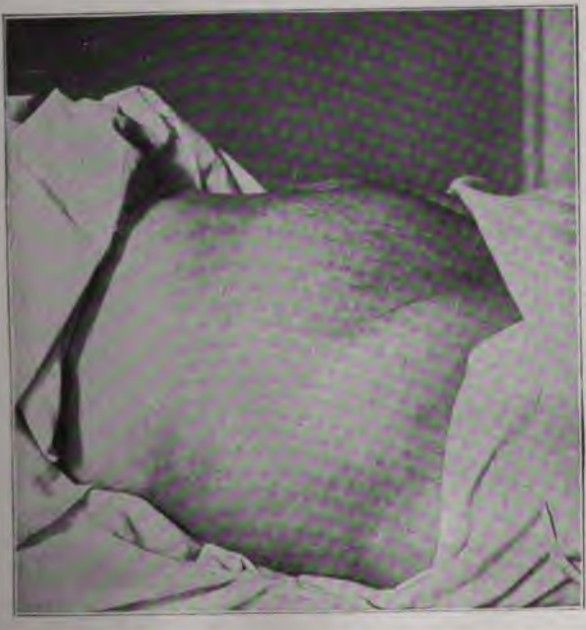


Fig. 18. Patient on table and arranged for abdominal examination.

Exceptionally.

Examination of rectum.
Pelvic examination under anesthesia.
Examination of bladder.

When the patient is seen at home, the order of examination is more frequently abdominal, vaginal, vagino-abdominal and, when indicated, a digital examination per rectum. Inspection of the external genitals and the speculum examination are usually not required in such a case (page 108).

However, if there are symptoms pointing to disease of the external genitals, the parts should of course be inspected. Also, in any case, if it is thought that information of value may be obtained by the speculum examination, that procedure should be carried out.

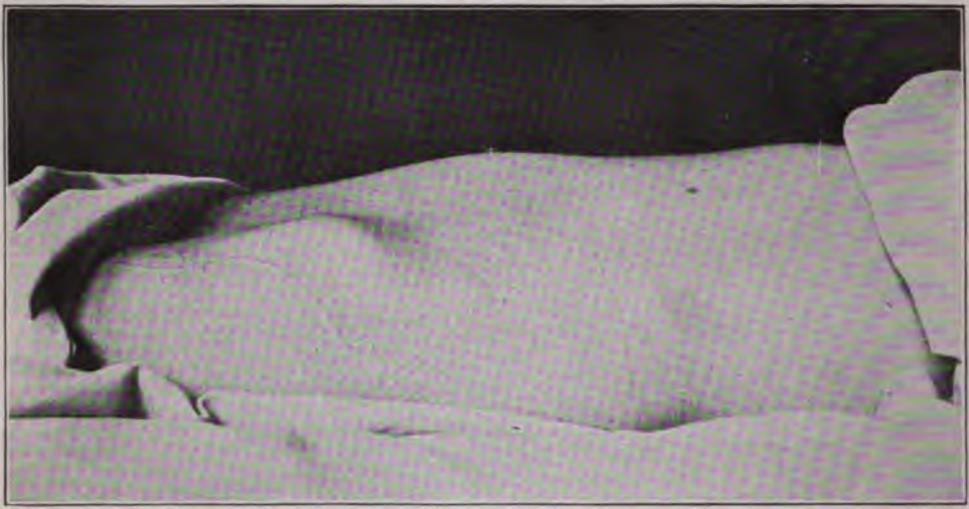


Fig. 19. Profile of Normal Abdomen. Patient arranged for abdominal examination.

ABDOMINAL EXAMINATION.

Have the patient lie near the edge of the bed or table, in a comfortable position, with the head slightly raised on a pillow and the knees drawn up sufficiently to relax the abdominal muscles (Figs. 18, 112).

The abdomen is subject to:

Inspection—Contour, Color, Eruption, Striae, Scars.
Palpation—Tension, Tenderness, Mass, Fluctuation, Fluid Wave, Fat Wave, Fetal Movement, Uterine Contraction, Friction Rub.
Percussion—Area of Dullness.
Auscultation—Fetal Heart Sounds, Vascular Murmur.
Menstruation—For accurate comparison.

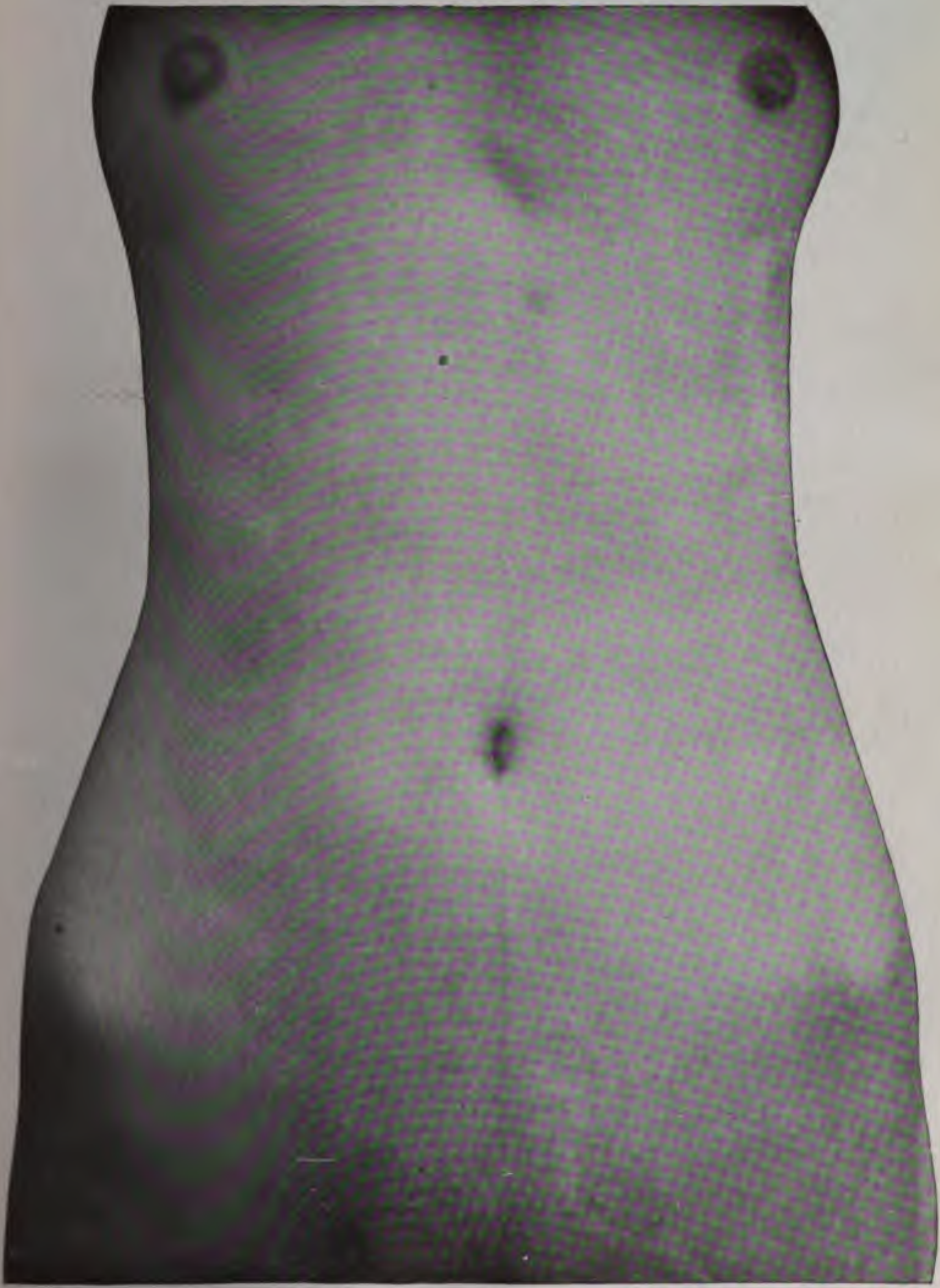


Fig. 20. Normal Abdomen. The patient is tall and rather slender. Notice how the anterior superior iliac spines stand out as landmarks.

INSPECTION OF ABDOMEN.

Contour, Movement, Color, Eruption, Striae, Scars.

The principal thing to determine by inspection is **contour.** Determine also the other items mentioned—movement of wall, color, eruption, striae, scars—but usually they are of secondary importance. As to contour, there may exist one of several conditions, as follows:

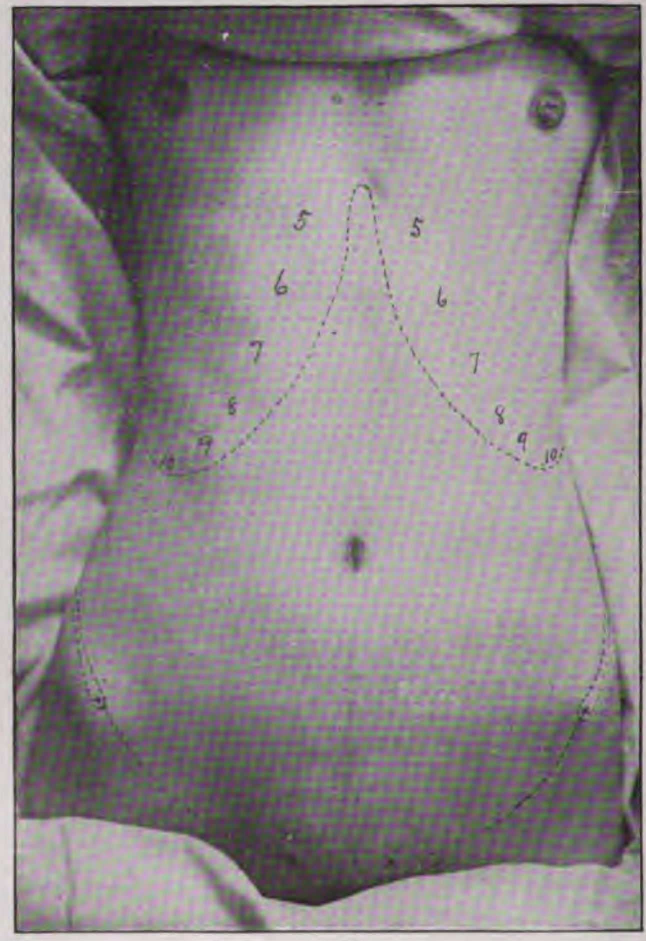


Fig. 21. The abdominal surface with the rib margins and the iliac crests outlined.

The smooth, moderately full contour of the normal abdomen (Figs. 19, 20, 21, 22).

The flat, sunken abdomen of wasting disease, with empty intestines.

A swollen, prominent abdomen.

The significance of prominence of the abdomen is taken up in detail in the chapter on Diagnosis (page 120).

PALPATION OF ABDOMEN.

Tension, Tenderness, Mass, Fluctuation, Fluid Wave, Fat Wave, Fetal Movement, Uterine Contraction, Friction Rub.

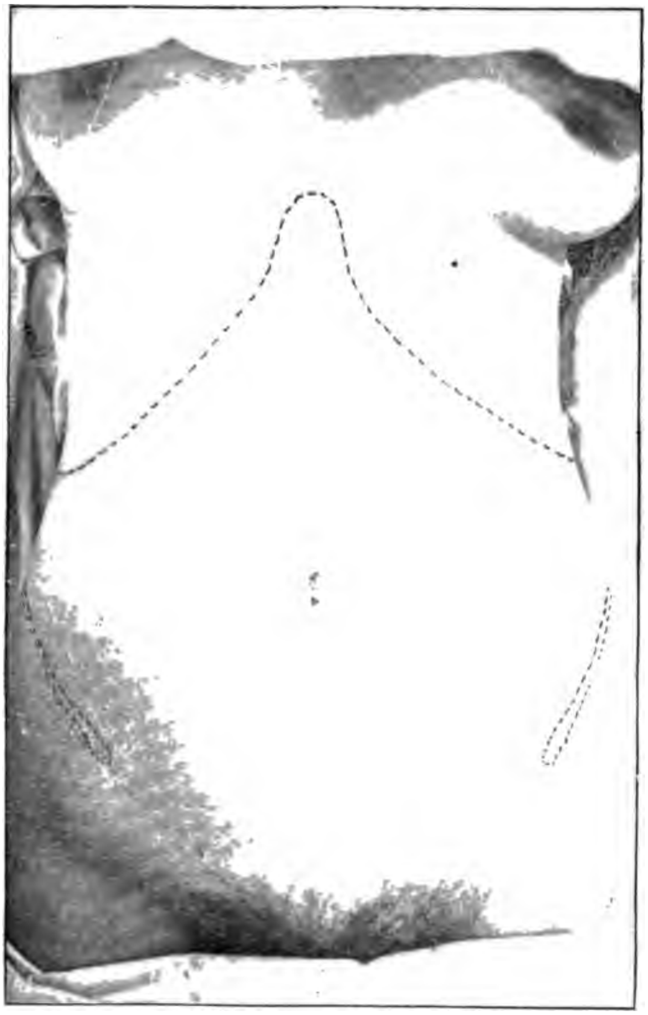


Fig. 22. Another abdominal surface, with the ribs and crests outlined. This patient is rather stout. Notice how much the landmarks differ from those in Fig. 21.

TENSION AND TENDERNESS.

As to **tension,** we determine whether the wall is soft and easily depressed, **or is firm and resisting from muscular tension. The latter condition may be** due to nervousness or fright, the patient fearing that the examination will cause pain, or it may be due to genuine **tenderness** from inflammation or irritation beneath the wall as in peritonitis or intraperitoneal hemorrhage.

The best way to begin palpation is to place the palmar surface of the

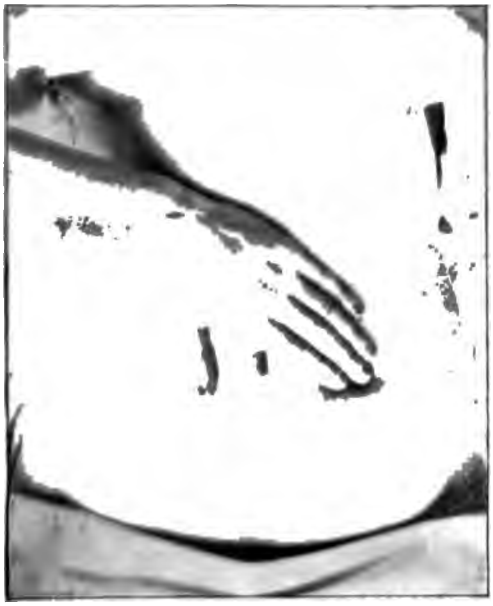


Fig. [illegible]. Palpation of the abdomen. First step. Hand flat on abdominal surface.

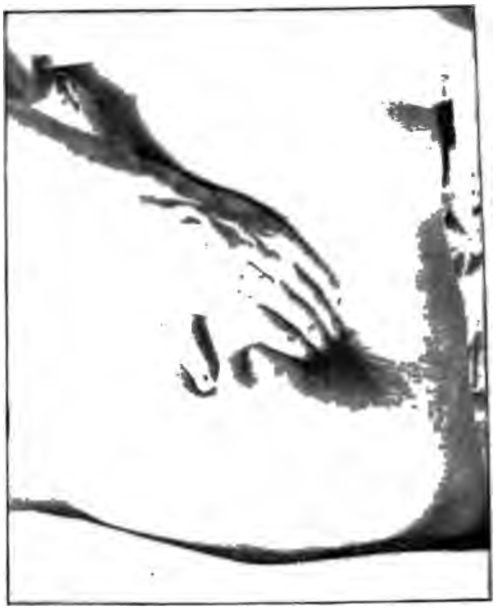


Fig. 24. Palpation. Depressing the wall with the fingers of one hand, in various situations.

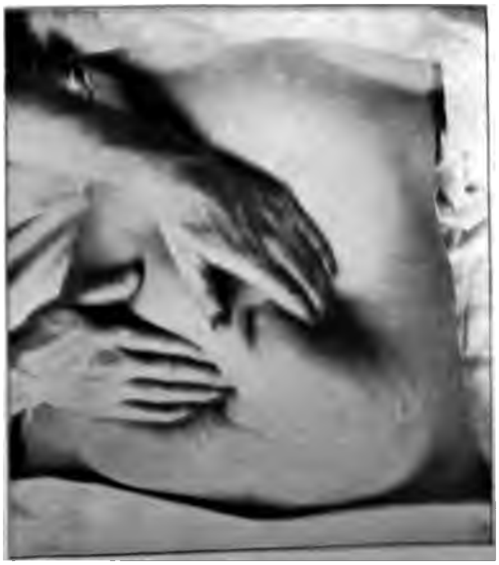


Fig. 25. Palpation with heel

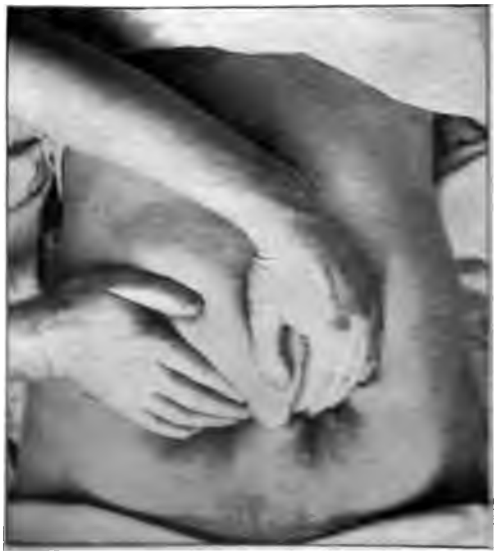


Fig. 26. Deep Palpation with both hands.

whole hand flat on the abdominal wall (Fig. 23). Hold it there perfectly quiet for a moment, that the patient may see that you are not going to cause pain. Then, as the muscular tension relaxes, depress the wall carefully with the fingers (Fig. 24) in various directions and situations as the hand is moved about over the surface. Begin the movement of the hand gradually, almost imperceptibly at first, perhaps at the same time directing the patient's attention away by a question or two. When the patient's attention is fixed on the palpating hands, there is likely to be troublesome tension of the wall. As the examination proceeds, **deep** palpation is made in various parts of the abdomen in order to exclude disease in the various regions. Palpation with **both hands** (Fig. 25) assists much in determining the character and consistency of the tissues between them and under them, particularly when the abdomen is rather full. If a resisting area is found, work the fingers around it, depressing the wall and examining all portions of it (Fig. 26). The palpation should always be made **gently,** for, if the manipulations cause pain or frighten the patient, the wall is immediately made tense and then no satisfactory examination is possible.

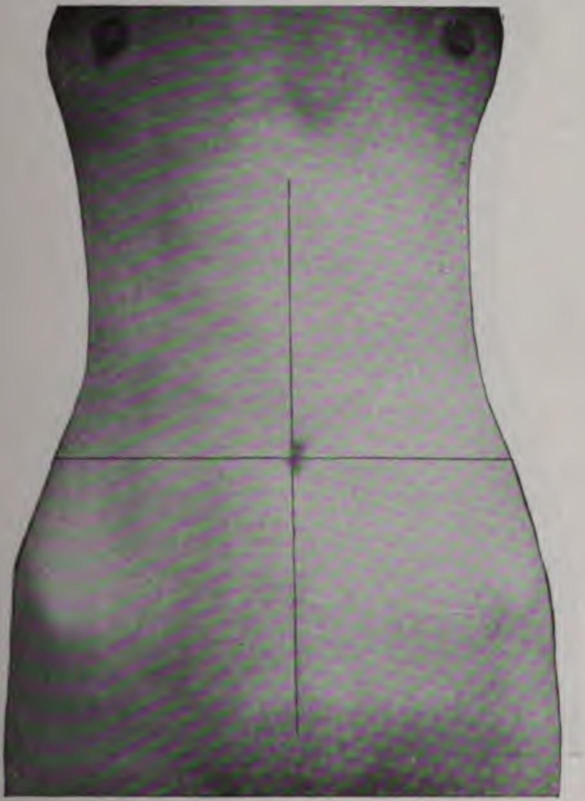


Fig. 27. The abdominal surface divided into Quadrants

Having determined the general tension and tenderness, search is made for **local tenderness.** The exact location of the tenderness should be carefully determined, and also whether it is circumscribed to that area or extends to other areas. When the area of tenderness has been accurately located, we know what organs are likely to be affected, and the further differentiation between affections of those organs may be proceeded with.

Regions of the Abdomen. For convenience in designating the location of tenderness or of a mass, the abdomen is divided into regions. There are many methods of division. A simple and useful one is the division of the surface into quadrants by an imaginary horizontal line passing through the umbilicus and a vertical line through the same point (Fig. 27).

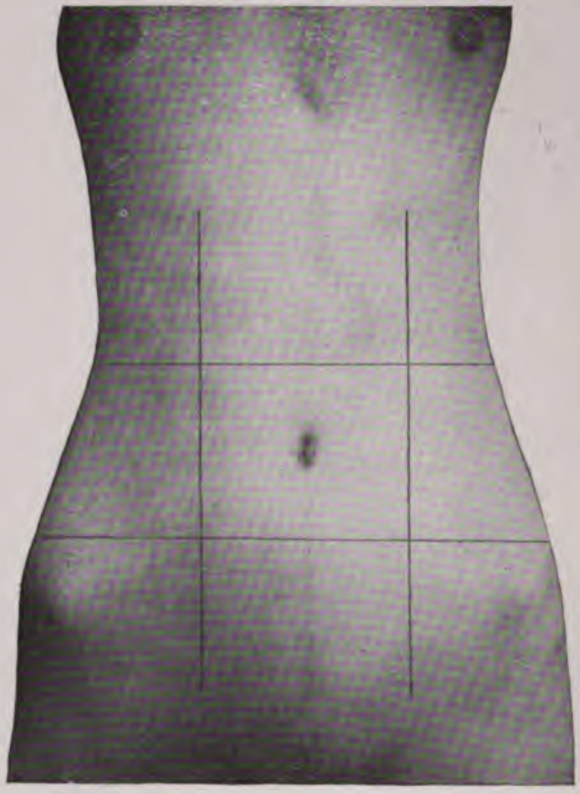


Fig. 28. The usual anatomical division of the abdomen into nine regions by two transverse lines and two vertical lines. The upper transverse line is at the level of the cartilages of the ninth ribs, and the lower with the highest points of the iliac crests. The two parallel vertical lines pass through the cartilages of the eighth ribs and the middle of Poupart's ligaments.

This is very convenient for designating in a general way the location of large masses, but it is not sufficiently definite for the accurate localization of small masses or points of tenderness.

For the more definite localization, the time honored division into squares, by two vertical and two horizontal lines (Fig. 28), is the one generally followed in anatomical and diagnostic works. However, as a practical working division for diagnostic and teaching purposes, this has been found decidedly inconvenient and unsatisfactory, as is attested by the many attempts of clinicians to devise a simple method of dividing the surface and of designating the various regions.

Failing to find a method of division that was satisfactory to me, I devised that shown in Fig. 29, which, so far as I know, is original. The only lines not marked by natural landmarks are a circle with a two-inch radius about the umbilicus and a short straight line extending horizontally for two inches from each side of the circle.

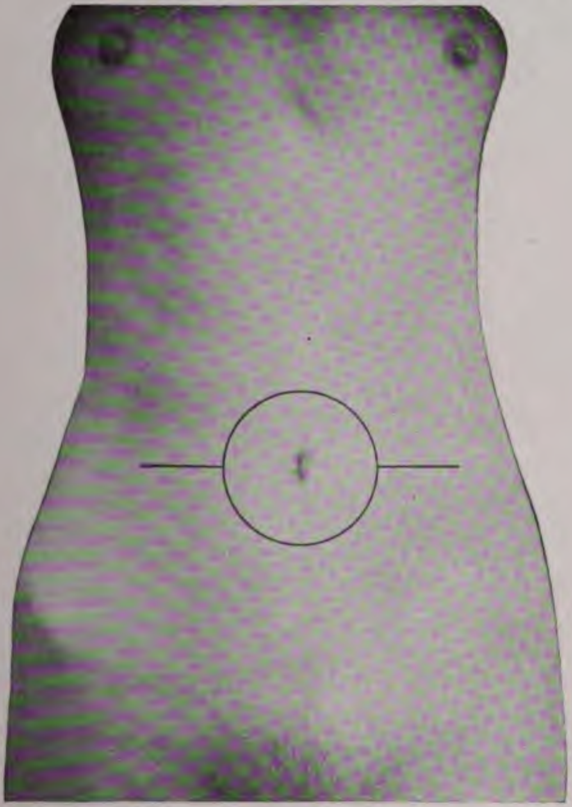


Fig. 29. Division of the abdomen into regions by means of a circle with a two-inch radius and two-inch horizontal lines.

The **regions** are designated as right lower, left lower, central lower, right upper, left upper, central upper, umbilical, and right and left lumbar (Fig. 30). This method of division is simple, and the names are easily remembered and are self-explanatory. In fact, these designations are the ones commonly used in conversation among physicians in describing the location of a mass or area of tenderness. For example, we speak of tenderness in the right lower region of the abdomen, or, more briefly, in the "right lower abdomen," or in the "left lower abdomen," or in the "right upper abdomen," etc.

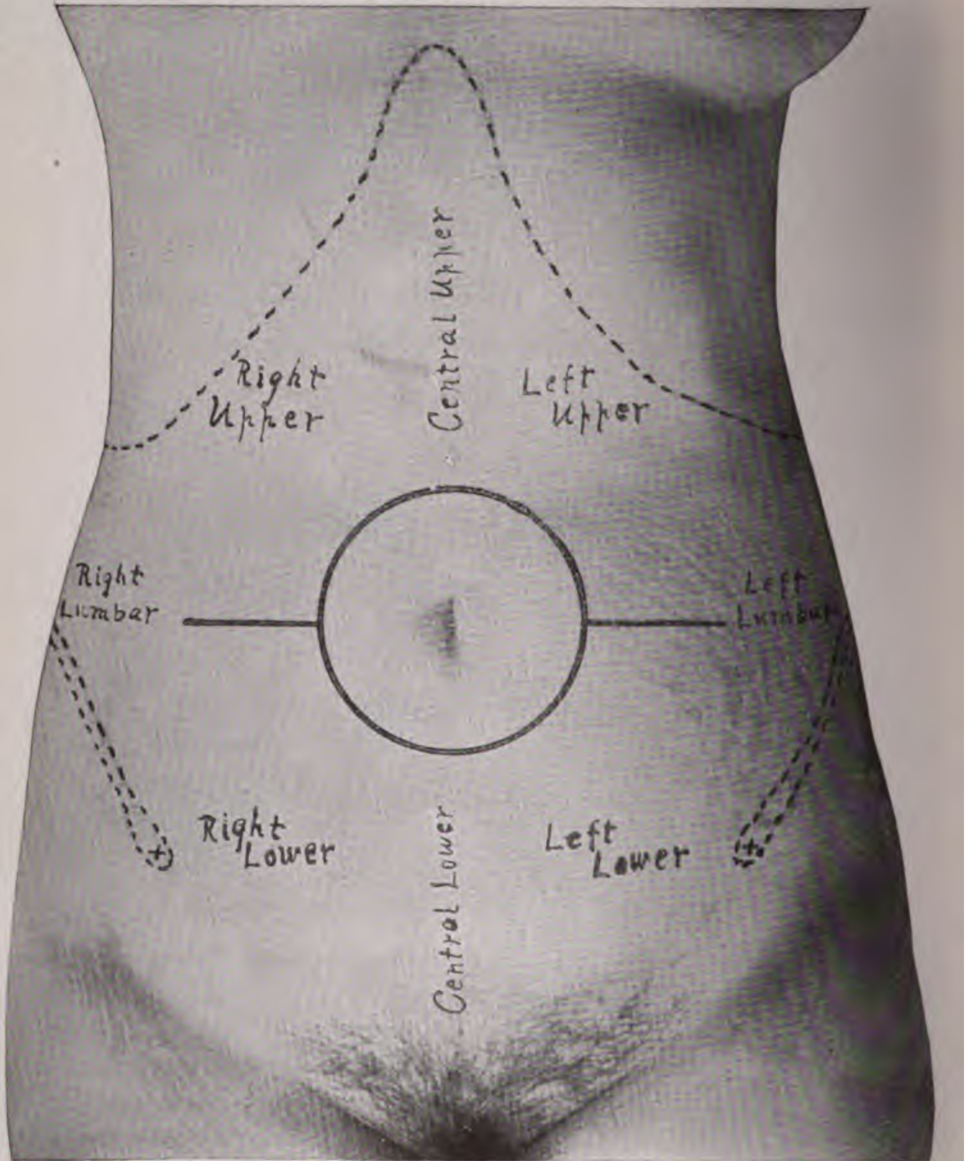
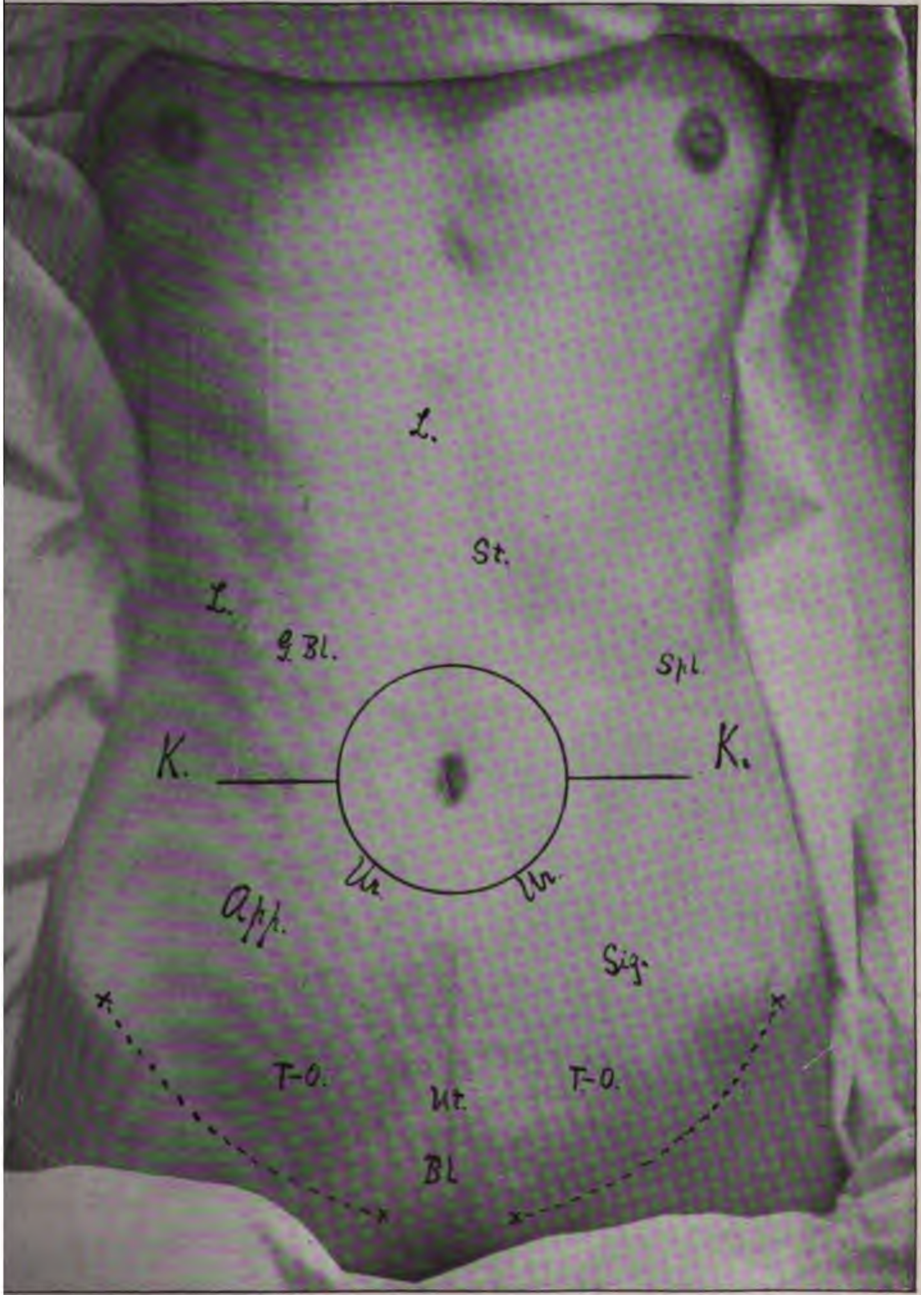


Fig. 30. Another abdomen divided with the circle and short horizontal lines, and showing the names on the primary regions. The area within the circle carries the usual designation, "umbilical region."

Within each of these principal regions there are one or more points which are of special interest. The special interest attaches to each one of these ts because well-defined tenderness limited to such point usually means ffection of a particular organ. It must be kept in mind, however, that me cases such point-tenderness is due to an affection of some adjacent



31. Various areas of significant Point-tenderness. These are the areas to be investigated during the of an abdominal examination.

organ (as when inflammation within the caecum causes tenderness in the appendix region), or even of some distant organ which has become displaced (as when the right kidney has become displaced into the appendix region).

Again, in some cases tenderness is due to an organic or functional disturbance of the nerves of the abdominal wall or to reflected pain, due to a lesion in some other part of the abdominal cavity or to some organic or functional lesion in a distant part of the body. But even in these exceptional conditions the tenderness is usually not a genuine "point tenderness," but

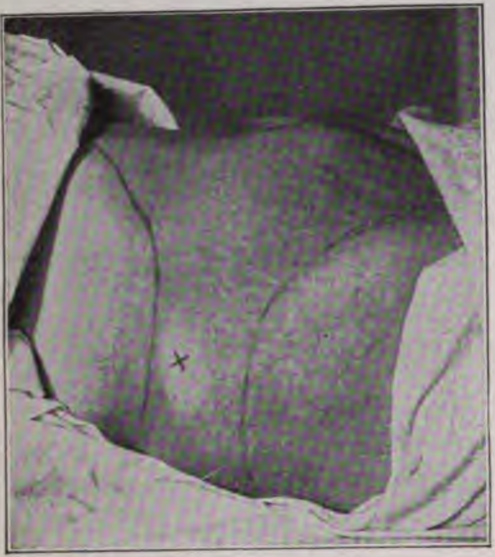


Fig. 32. Point for Kidney Tenderness laterally.

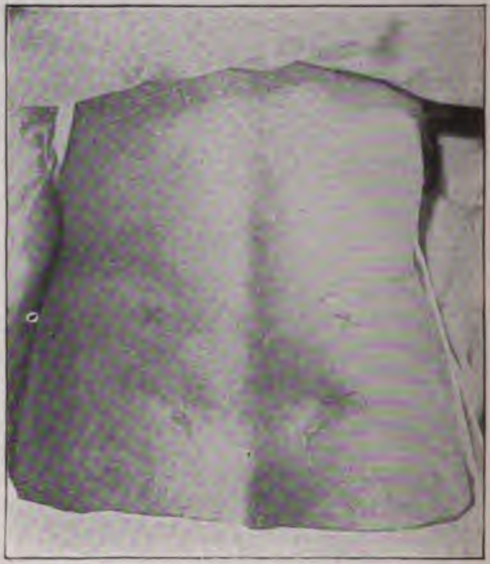


Fig. 33. Points for Kidney Tenderness in the back.

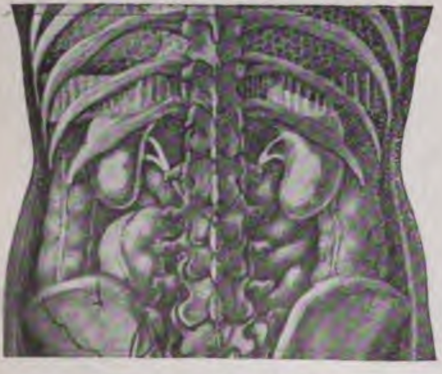


Fig. 34. Relation of the Kidney to the lower margin of the last rib. (Butler—*Diagnostics of Internal Medicine.*)

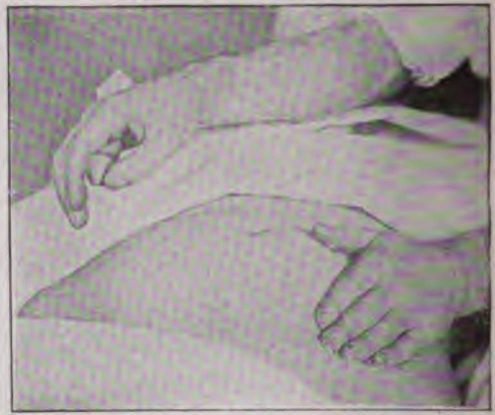


Fig. 35. Trying for a Fluid Wave across the abdomen.

is more extensive and can be traced in some direction sufficiently far to indicate its probable origin.

With the exceptions above mentioned kept in mind, the special areas of "point tenderness" are of great help in the differential diagnosis of abdominal lesions.

I do not approve of the method of naming the principal, or primary, regions of the abdomen from the significant point-tenderness situated therein. For example, to designate the right lower abdomen as the "appendiceal region," as is done by some authorities, leads only to confusion. It is no more the appendiceal region than it is the caecal region, or the tubo-ovarian region, or the ureteral region. The term "appendiceal region" should be reserved for the very circumscribed area immediately over the appendix, the same as the terms "tubo-ovarian region" and "ureteral region" should be limited to the areas containing those structures. Then, when we speak of tenderness in the appendiceal region. there is no question as to the exact location of the tenderness.

The principal **areas of significant point-tenderness** are shown in Fig. 31. There are, of course, also many areas of secondary importance—of secondary importance because tenderness or a mass therein is not of such definite significance.

After locating accurately the point of greatest tenderness, try to **trace the tenderness in various directions.** This is especially useful in cases which are doubtful, because the tenderness is not typically situated or is not well limited.

For example, take a case in which the most marked point-tenderness is situated about midway between the right tube, the appendix and the ureter. It may be due, among other things, to disease of the tube or ovary, or of the ureter or caecum, or of the appendix or small intestine, or of the peritoneum. Determine if well-marked tenderness can be traced down toward Poupart's ligament and the tube. If the tenderness does not extend in that direction, it is probably not due to trouble about the tube or ovary. Then try to trace it to the ureter and along the ureter downward toward the bladder and upward toward the kidney. Determine also if it spreads over the caecum and extends up along the ascending colon, as it is likely to do when caused by inflammation of the large bowel. Determine if it extends through the abdomen generally, including the umbilical region and beyond.

If it does not extend in any one of the directions mentioned, but is strictly limited to the point designated, it is probably due to appendix trouble, which probable diagnosis must be strengthened or weakened, as the case may be, by other signs present and by the history of the trouble.

In those cases in which there is a question as to whether or not the tenderness is due to trouble in the ureter, particularly where the tenderness extends over the whole right lower or left lower abdomen, or is so acute as to prevent the deep palpation necessary to accurate localization, palpation of the lumbar region laterally and posteriorly is of much assistance in the differential diagnosis. **Well-marked** ureteritis is usually accompanied by pyelitis and kidney tenderness. In such a case there is distinct tenderness over the kidney laterally (Fig. 32) and also posteriorly (Figs. 33, 34).

Mass in the Abdomen.

When a mass is discovered, determine as far as possible its position, size, shape, consistency, tenderness, mobility and attachments.

The **position of a mass** indicates in a general way the organ or group of organs from which it arises. Keep in mind, however, that it may be due to some adjacent organ, or even some distant organ displaced into that region.

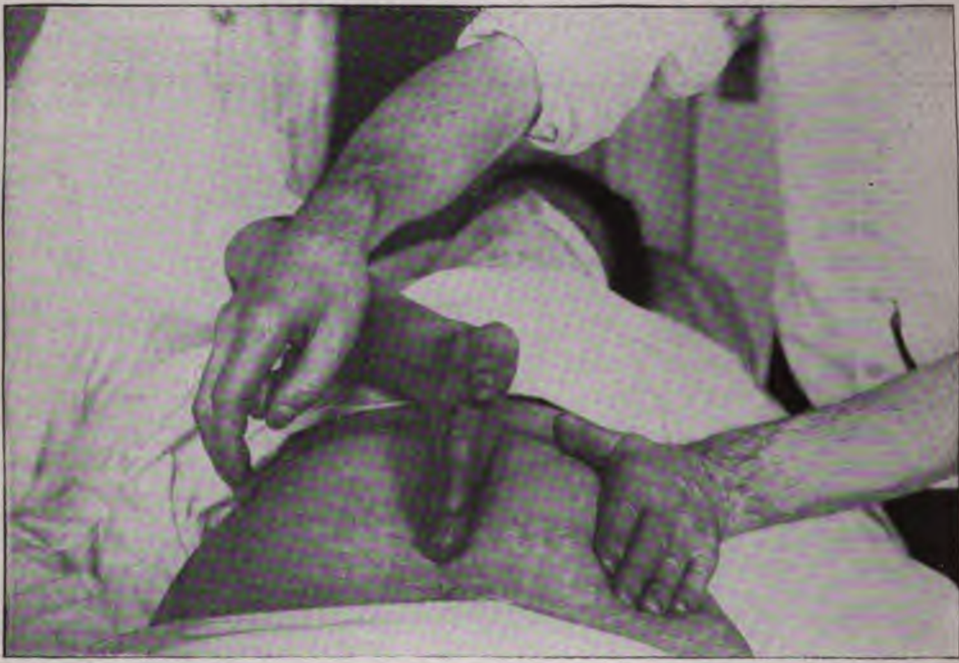


Fig. 36. Differentiating a Fat-wave from a Fluid-wave. The Fat-wave is stopped by the pressure in the median line

The **size and shape of a mass** is determined by ascertaining its length, breadth, thickness and general contour. The length or height of a tumor projecting up from the pelvis is usually designated as so many inches or centimeters above the symphysis pubic, or below the umbilicus or above the umbilicus. The breadth may be given approximately in inches or centimeters, stating at the same time whether or not the mass is situated symmetrically on either side of the median line, or the mass may be referred to as filling the pelvis from side to side or as filling the abdomen. It is sometimes difficult to convey a satisfactory idea of the general contour of a mass by a detailed description, when it may be very quickly conveyed by referring to some well-known object—e. g., an egg, a lemon, a kidney or an hour-glass. The **consistency of a mass** should be carefully determined. Is it uniformly solid or does it present hard nodules, or does it contain fluid? If the mass contains a collection of fluid of sufficient size, there may be elicited that peculiar sensation known as **fluctuation,** the recognition of which is one of the first lessons in surgical work. If there is a large collection of fluid, as in a case of marked ascites, a **fluid wave,** started by tapping on one side of the abdomen, may be felt by the other hand applied to the other side (Fig 35). A somewhat similar wave may be caused, also, by a thick layer of subcutaneous fat (fat wave). In such a case, however, if an assistant press lightly in the median line with the ulnar edge of the hand, the **fat wave** will stop at the line of pressure (Fig. 36).

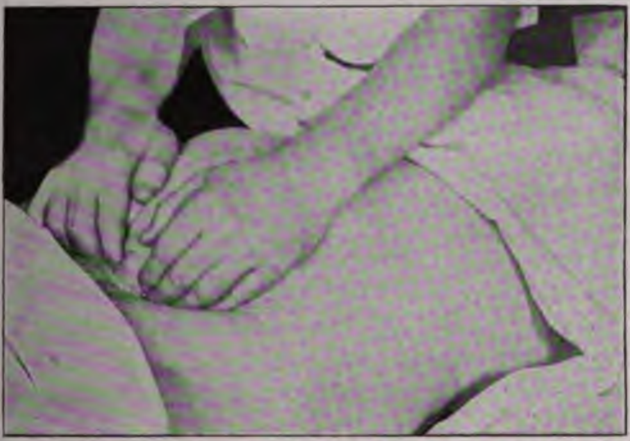


Fig. 37. Attempting to Displace a mass upward in order to determine if it has a pelvic attachment.

A distinct fluid wave may be obtained in any large collection of fluid with a comparatively thin wall. It is present in well-marked ascites, in unilocular cysts and in multilocular cysts with one or more large cavities. Occasionally the fact that there are different large cavities in the cyst may be surmised by a distinct difference in the fluid wave as obtained through different parts of the cyst. In a cyst with small cavities no fluid wave is obtained, as there is not a large enough single cavity, although fluctuation may be as clear as in a single large cyst. Also, in a cyst with thick gelatinous contents a fluid wave may not be obtained.

The **tenderness of a mass** as determined by palpation is of much importance in differential diagnosis. In acute inflammation (as in acute salpingitis or peritonitis), or in acute irritation (as in hemorrhage from tubal pregnancy), the tenderness is very marked. On the other hand, in uncomplicated ovarian or uterine tumors, tenderness is slight.

The **mobility** and **attachments of a mass** are determined by attempting to move the mass in different directions. The fingers are worked in deeply about the mass at various points, and it is determined just what part may be easily displaced and what part is fixed (Fig. 37). The fixed point of a mass usually indicates its point of origin—i. e., the organ involved. The presence or absence of mobility helps to determine whether or not the mass is bound down by inflammatory exudate or is retroperitoneal, or is in the abdominal wall.

Occasionally a mass is not mobile because it is so large that it fills the abdominal cavity. Some retroperitoneal masses (particularly kidney tumors) present marked mobility in certain directions.

Fetal Movement, Uterine Contraction, Friction Rub.

In late pregnancy, **fetal movement,** caused by the fetus changing position or kicking, may not infrequently be felt. Dipping the hands in cold water and then laying them flat over the uterus may cause the fetus to move.

The absence of fetal movements is of no diagnostic significance, but the presence of them is of course certain evidence of existing pregnancy and consequently well worth trying for in a doubtful case.

The same may be said of the **intermittent contraction** and relaxation of the pregnant uterus. In some cases alternate hardening and softening of the uterus may be very distinct, and is positive evidence of the character of the mass under the hands.

A **friction rub** may sometimes be felt in a case of active peritonitis, particularly in the local plastic or irritative peritonitis that not infrequently takes place when a tumor lies against the abdominal wall. The hand is pressed over the mass during forced respiration. Occasionally the friction rub may be obtained over the liver or spleen when there is a local peritonitis there.

PERCUSSION OF ABDOMEN.

Areas of Dullness.

Percussion over the abdomen serves to confirm the information obtained by palpation, and also brings out some new facts—for example, by outlining accurately the **area of dullness** it shows at what portion of the abdominal wall the tumor or fluid lies against the wall, and at what portion there is intervening intestine. It shows also whether the mass or fluid changes relations when the patient changes position. In a ventral hernia (intestinal) it shows that the large mass, which might be taken for a tumor or inflammatory mass, is resonant—i. e., it contains air, and therefore must, under ordinary circumstances, contain intestine.

The use of **superficial** and **deep** percussion in succession may give valuable information in some cases. Ordinary percussion (Fig. 38) is moderately light and superficial, and gives resonance over all the normal abdomen, except where the liver lies against the wall. In marked obesity, however, superficial percussion is likely to give only dullness over all the abdomen, while deep percussion (a hard percussion stroke against the finger pressed in deeply—Fig. 39) gives resonance.

A tumor of the wall or of the omentum ordinarily gives dullness in light percussion and resonance in deep percussion.

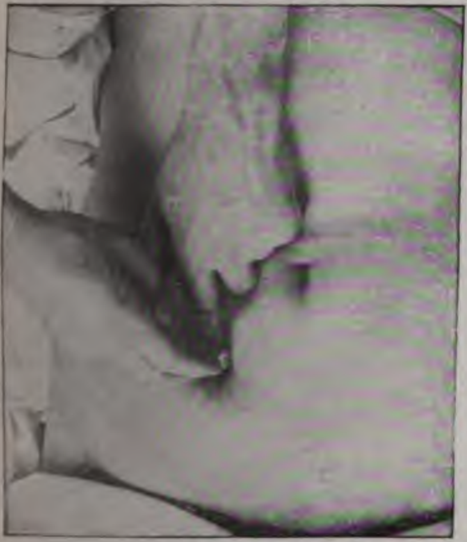


Fig. 38. Ordinary Percussion, which is usually rather superficial.

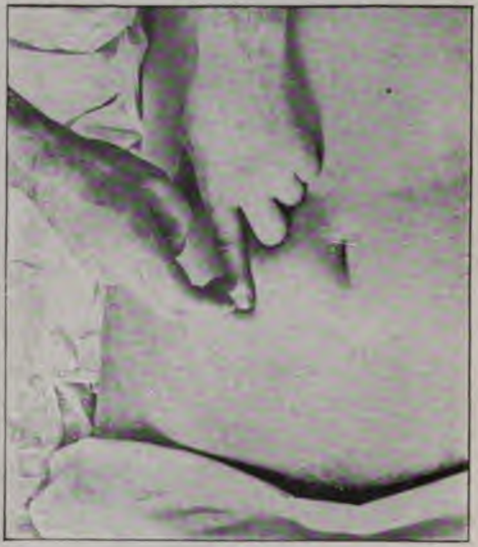


Fig. 39. Deep Percussion. Notice how the left index finger is pressed into the abdomen, so as to thin out the wall and get closer to deep structures.

Endeavor to get definitely in mind exactly the reason for the dullness or resonance found in a particular case, and then its diagnostic significance will be clear.

AUSCULTATION.

Fetal Heart Sounds, Vascular Murmur.

Auscultation, either by the ear direct (a sheet intervening) or by the stethoscope, should always be employed when there could be any confusion with advanced **pregnancy,** as in a case of large ovarian tumor or large fibroid. The fetal heart sounds are the only sounds pathognomonic of pregnancy. The placental murmur may be simulated by the large vessels of a tumor. The absence of fetal heart sounds does not exclude pregnancy, for even in cases of normal pregnancy they cannot always be heard. Auscultation should be employed also in obscure cases of pain in the abdomen, particularly if accompanied by pulsation. The pain may be due to an **aneurism** of the abdominal aorta, which occasionally runs its course unrecognized until rupture and sudden death. In auscultation for aneurismal murmur with a stethoscope, be careful that the abdominal wall is not pressed firmly against the aorta with the stethoscope, for such pressure will cause a murmur in a normal vessel

Excessive gurgling in the intestines may be heard in most intestinal diseases accompanied with tympanites. It is heard particularly in the region of the ileocecal valve or about a partial obstruction or over a loop of bowel in peristaltic movement. Gurgling over a large mass indicates that one or more intestinal coils are between it and the abdominal wall. This intestine may be in front because the mass is retroperitoneal or because an intestinal coil is adherent over the mass, or because the mass is made up partly or wholly of adherent intestinal coils.

A **friction sound** may occasionally be heard in local peritonitis, particularly over the areas of fresh plastic peritonitis or over a tumor.

MENSURATION OF ABDOMEN.

Measure the abdomen when it is very large or when there is a growing tumor, or when for other reason it may be desirable to know **exactly any difference** in size some weeks or months hence, or when it is desired to speak with accuracy concerning the size of the abdomen in the case of a large growth.

The measurements are made with the ordinary tape-line. When measuring

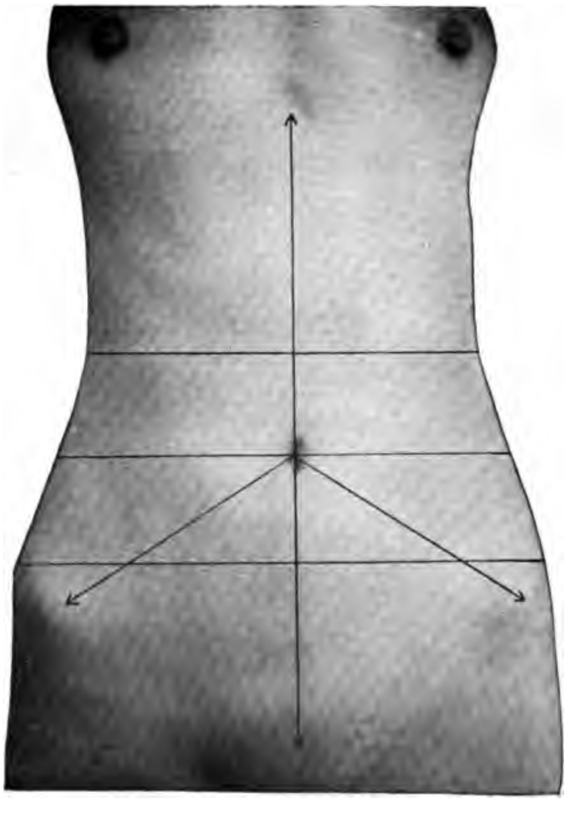


Fig. 40. Showing the lines for Mensuration.

a patient, take enough measurements to make an accurate record. Measurements along the lines shown in Fig. 40 will show variations with a large growth in any part of the peritoneal cavity. They are as follows:

1. From umbilicus to sternal notch.
2. From umbilicus to pubes.
3. From umbilicus to right anterior superior iliac spine.
4. From umbilicus to left anterior superior iliac spine.
5. Circumference of body at level of umbilicus.
6. Circumference of body 3 inches above umbilicus.
7. Circumference of body 3 inches below umbilicus.

EXAMINATION OF EXTERNAL GENITALS AND ADJACENT STRUCTURES.

If the patient complains of irritation about the external genitals, or of itching or burning, or of frequent or painful urination, or of sores or swelling, or discharge, the parts should be inspected in a good light. For this examination, as the patient is lying on the table, the lower extremities are covered with a sheet, the skirts are pushed above the knees and out of the way, and the hips are brought to the end of the table, as shown in Fig. 41.

A general inspection is then given the parts, to ascertain if they are practically normal (Figs. 42, 43) or if there is marked abnormality. The labia are then separated, to expose the vestibule and urethral and vaginal openings, and also the openings of the ducts of the vulvo-vaginal glands (Figs. 44, 45).

By examination determine if any of the following conditions are present:

Discharge—Muco-epithelial, Muco-purulent, Purulent, Bloody, Watery.
Inflammation—Gonorrhoeal or otherwise.
Ulcer—Simple, Chancroidal, Syphilitic, Tubercular, Malignant.
Swelling—Inflammatory, Stasis Infiltration, Oedema, Hematoma, Hernia, Cyst.
New Growth—Condyloma, Urethral Caruncle, Lipoma, Fibroma, Malignant Growth.
Malformation—Adhesions of Labia, Pseudo-hermaphroditism.

Determine also the

Condition of Hymen—Intact, Lacerated, Destroyed.
Condition of Perineum—Normal, Lacerated (wide opening, vaginal walls visible, shallow perineum, scar tissue, fistula).

DISCHARGE ABOUT EXTERNAL GENITALS.

Muco-epithelial, Muco-purulent, Purulent, Bloody, Watery.

Muco-epithelial Discharge (normal). The normal mucus secretion from the cervix moistens and macerates the vaginal epithelium. The mixture of this cervical mucus and vaginal epithelium appears at the external genitals as a white, crumbly discharge. Usually it is hardly noticeable, only just enough to keep the parts normally moist. At the menstrual periods, and under other conditions favoring pelvic congestion, it may increase so as to be somewhat annoying to the patient, though hardly of pathological importance.

Muco-purulent Discharge. When there is inflammation or persistent congestion in the uterus, the mucus secretion is much increased, and there are thrown out, at the same time and for the same cause, many leukocytes, which mix with the mucus, giving it somewhat of a purulent character, the prominence of the purulent feature depending on the amount of this admixture of dead leukocytes. If it contains enough mucus to be noticeable, the discharge is sticky and stringy, and may be drawn out into long threads.

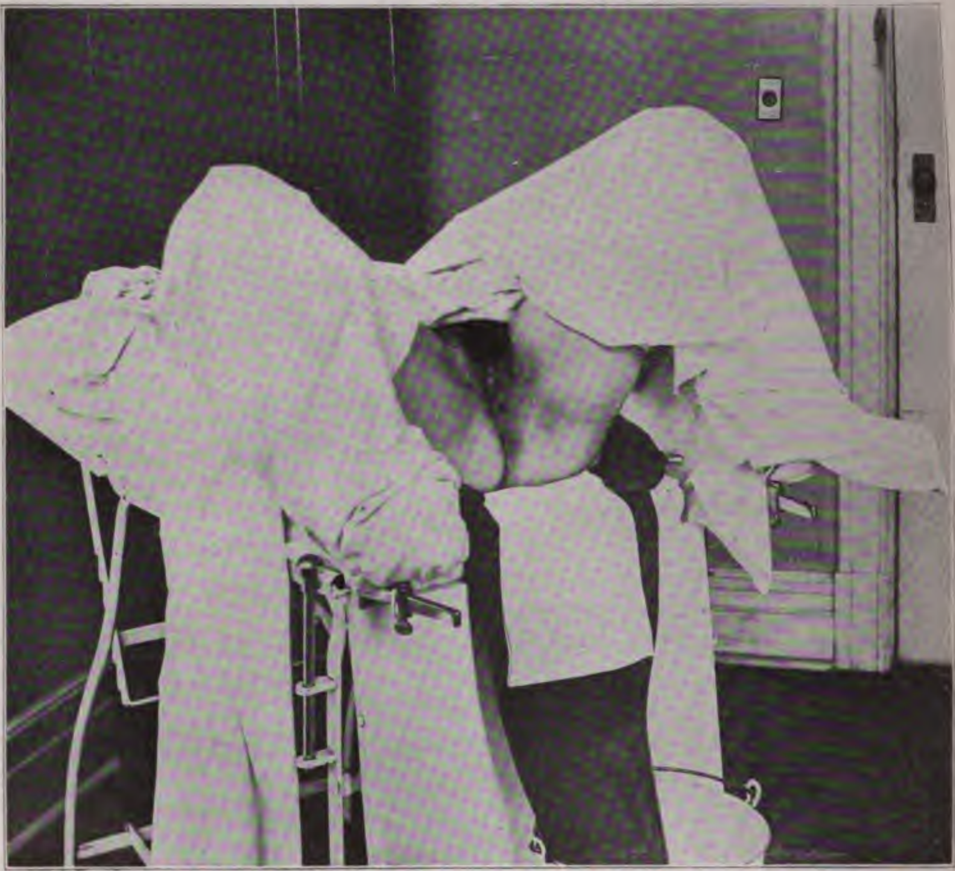


Fig. 41. Patient in position for Examination of External Genitals and adjacent structures.

Purulent discharge presents the appearance of pus, as from an abscess or inflamed surface, either thin pus or thick yellow pus. Determine just where this comes from—i. e., whether from the urethra or vulvo-vaginal gland, or inflamed surfaces on the external genitals or from the vagina.

Dip the tip of a cotton-wrapped applicator in this purulent discharge and spread some on a microscopic slide.

If possible, secure some discharge from the urethra or vulvo-vaginal gland, for the pus from these situations is much more satisfactory for microscopic examination than the mixed vulvar or vaginal discharge.

To secure urethral pus, separate the labia, cleanse the meatus, and compress the internal end of the urethra by pressure against the anterior vaginal wall with the tip of the index finger. Then, still maintaining the pressure, draw the tip of the finger along the urethra toward the meatus (Fig. 46). This brings the urethral pus to the meatus (Fig. 47).

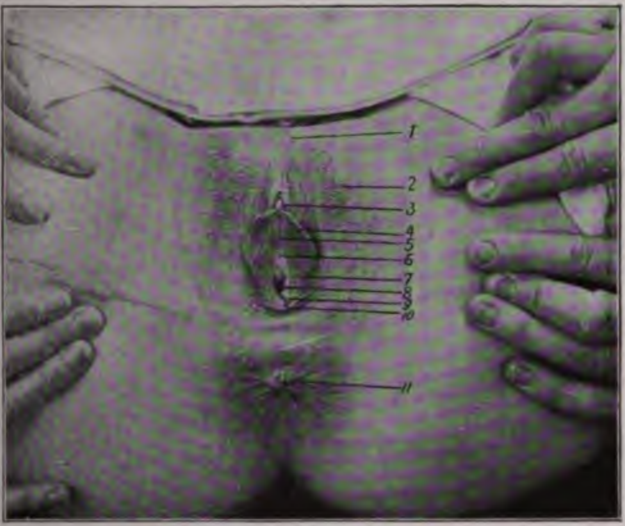


Fig. 42. External Genitals. 1. Mons veneris. 2. Left Labium Majus, drawn aside. 3. Clitoris. 4. Left Labium Minus, slightly larger than the average. 5. Vestibule. 6. Urethra. 7. Duct of Vulvo-vaginal Gland. 8. Vaginal Entrance. 9. Remains of Hymen. 10. Fourchette. 11. Anus. (Byford—*Manual of Gynecology*.)

Chronic inflammation in the urethra is likely to be situated in Skene's glands, and in such a case some pus may be pressed from these small glands by compressing the urethra (by pressure through anterior vaginal wall) just back of the meatus. In some cases, particularly in multipara, the urethral mucosa pouts out, so that by careful examination the orifice of one or both of Skene's glands may be seen. Fig. 48 shows such a gland-opening (left side) and also a drop of pus which has been pressed from the gland on the right side.

The vulvo-vaginal glands (Bartholin's glands) are situated symmetrically on either side of the vaginal opening, as shown in Fig. 49. The opening of the duct of the gland of each side is situated laterally, just in front of the remnants of the hymen and a little below the middle of the lateral margin of the vaginal opening. Draw aside the labia in this situation and look for the opening of the gland, and determine whether or not the opening is reddened and if there is any discharge from it (Fig. 50).

To examine either vulvo-vaginal gland, to determine if there is any thickening or tenderness from inflammation, or if pus can be squeezed from it, grasp the region of the gland between the index finger in the vagina and the thumb outside, as shown in Fig. 51.

When securing secretion for microscopic examination, it is well to take discharge from different localities, making the spread with the applicator-tip in the form of different letters for different regions—for example, U (urethra), V (vagina), C (cervix). If the specimens are to be sent to a laboratory, stick a small label to each slide, and write on it the date, the patient's initials, and the exact locality from which it was taken. In a doubtful case of urethritis, in which no secretion can be secured at the first examination, direct the patient to pass no urine for two or three hours before the next examination.

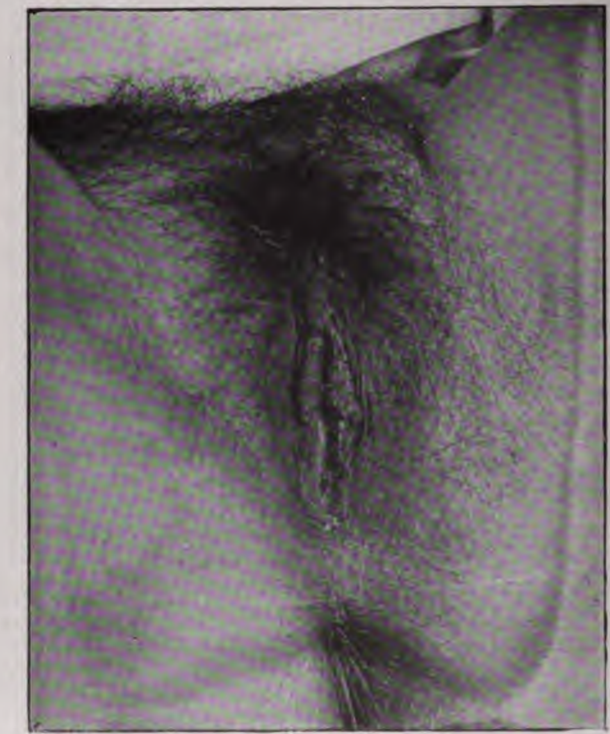


Fig. 43. Practically Normal External Genitals—multipara, labia together. The corrugations of the labia minora can hardly be called abnormal.

Bloody Discharge. The discharge is red or brown, the intensity of the color depending, of course, upon the amount of blood. It varies all the way from a slight reddish or brownish tinge, hardly noticeable, to practically pure blood or clots. The blood may be mixed with any of the other pathological discharges—muco-purulent, purulent or watery. The causes of blood in the vaginal discharge are enumerated in chapter II (page 179).

Watery Discharge. A portion of the discharge appears like water. This may be associated with the normal muco-epithelial discharge or with a muco-purulent or purulent discharge. The most common cause of a watery discharge is the decomposition of a malignant tumor-mass in the vagina or uterus, giving the characteristic watery, foul-smelling discharge of advanced cancer or sloughing fibroid.

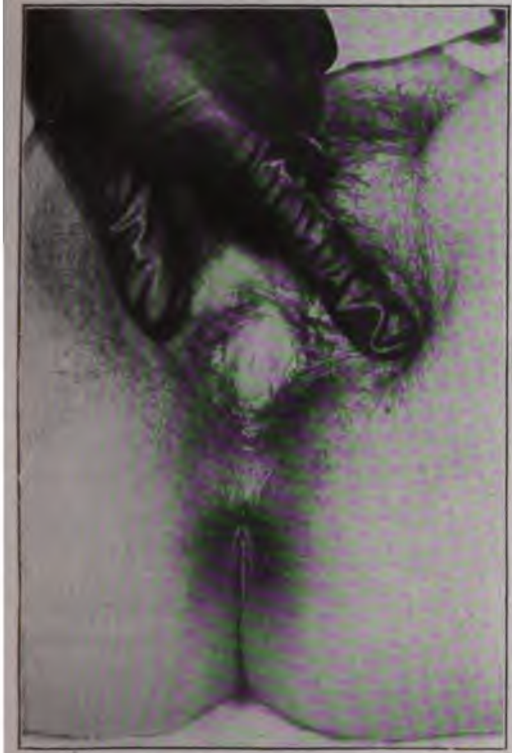


Fig. 44. Labia separated, to expose upper part of vestibule.

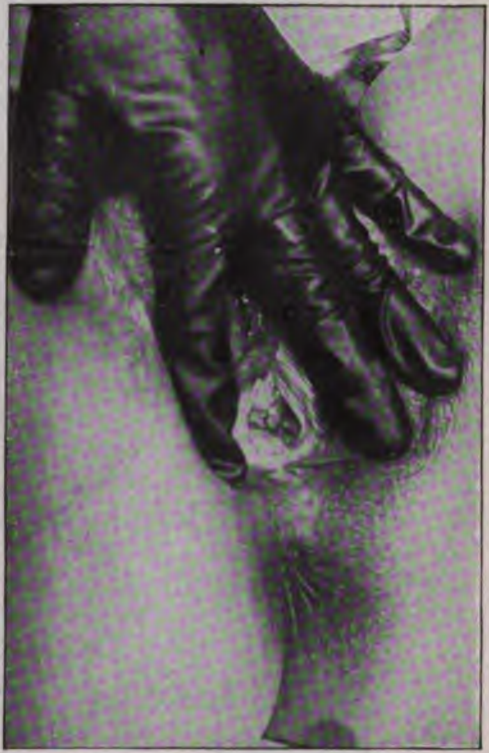


Fig. 45. Labia separated, to expose lower part of vestibule.

INFLAMMATION ABOUT EXTERNAL GENITALS.

Gonorrhoeal or Otherwise.

Inflammation is indicated by redness and tenderness, either diffused or in spots. It is usually accompanied by smarting or burning on urination. The smarting on urination and the increased frequency of urination are most marked when the urethra is involved.

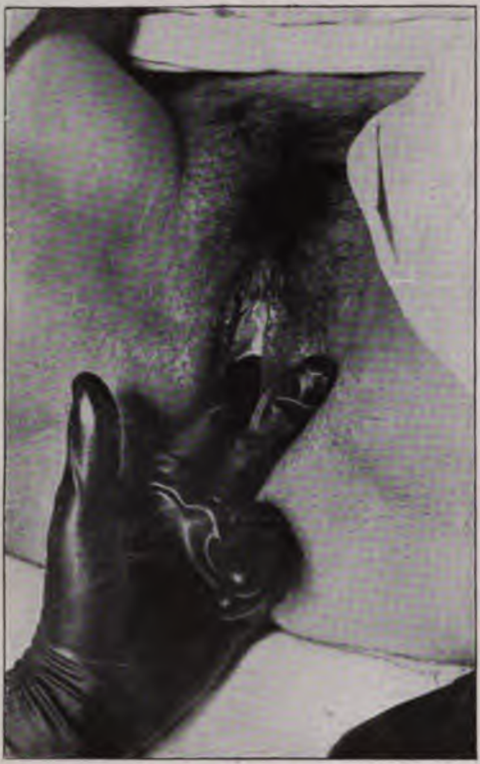


Fig. 46. Method of pressing pus from the depth of the urethra to the meatus.

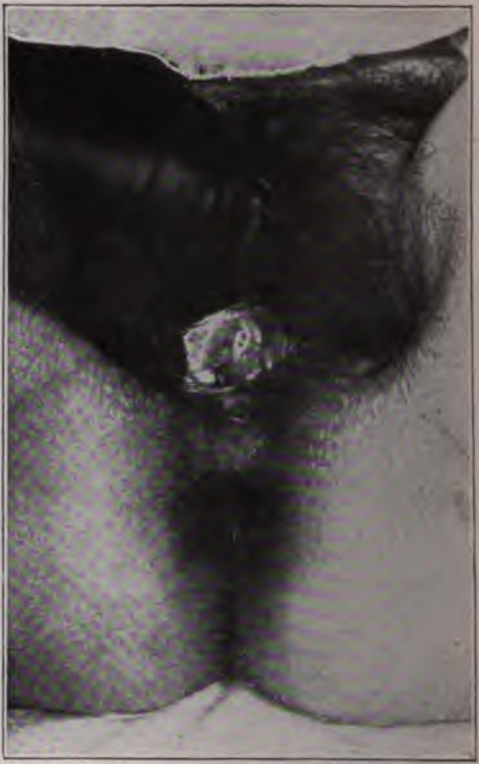


Fig. 47. Appearance of pus at the urethral opening.

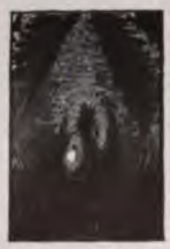


Fig. 48. Slight eversion of urethral mucosa, so that openings of Skene's glands come into view. On left side the gland opening is seen. On right side a drop of pus has been squeezed from the gland and partially obscures the field. (Kelly—*Operative Gynecology*.)

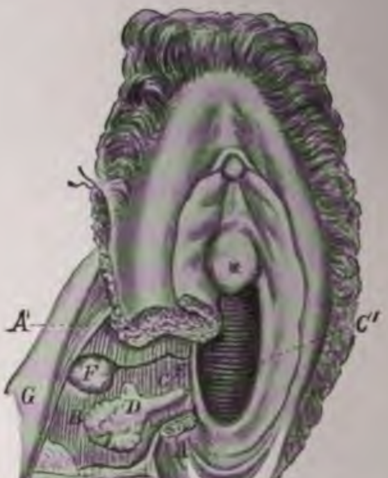


Fig. 49. Vulvo-vaginal gland (D) and duct (C) of right side. (Byford, after Huguier.—*Manual of Gynecology*.)

ULCER ABOUT EXTERNAL GENITALS.

Simple, Chancroidal, Syphilitic, Tubercular, Malignant.

If an ulcer is found, determine its position, size, shape, consistency (edge and underlying tissues), tenderness and mobility (whether fixed to underlying deep structures or freely movable). Determine also the character of the discharge from it, and whether it bleeds readily on touching. Notice whether the base is made of regular granulation tissue or has yellow dots scattered in it, or is filled with a slough. Examine also the edges—do they slope from within outward, as in an ordinary ulcer when healing, or are they sharp-cut and perpendicular, or undermined as in a rapidly spreading chancroid? Is there a red acute-inflammatory zone about the ulcer or is there a wide area of chronic infiltration (chronic inflammation, malignant)? Is there only a single sore or are there several? Are the inguinal glands affected? If so, in what way? Is there any other condition indicating the cause and character of the ulcer? For the **differential diagnosis** of the various kinds of ulcer see the consideration of ulcers in chapters II and IV.

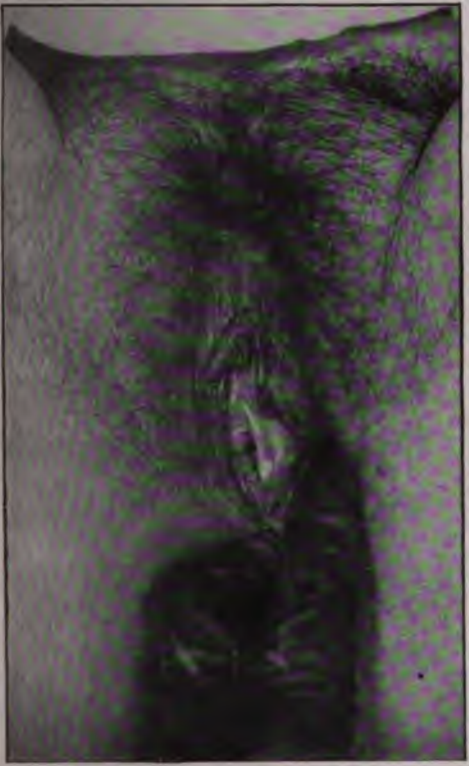


Fig. 50. Appearance of pus about the opening of the left vulvo-vaginal gland.

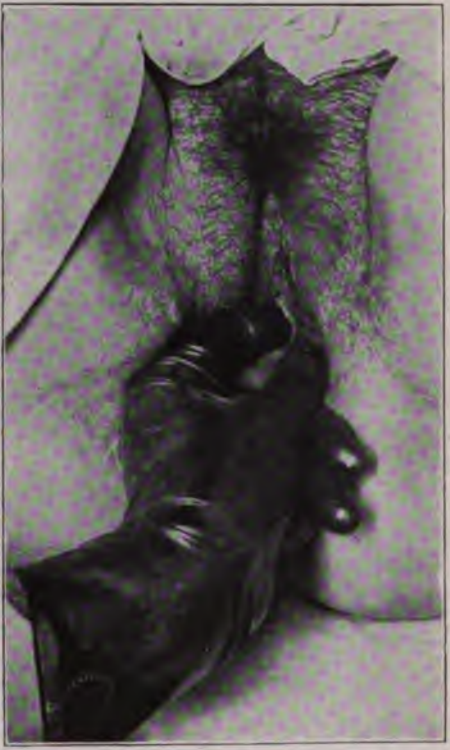


Fig. 51. Palpating the left vulvo-vaginal gland, to determine if there is thickening or tenderness, or if pus can be pressed from it.

SWELLING ABOUT EXTERNAL GENITALS.

Inflammation, Stasis Infiltration, Oedema, Hematoma, Hernia, Cyst.

Swelling may be **inflammatory** (as in acute oedema or abscess), or **obstructive** (as in oedema from obstruction by heart or liver disease or from tumor in abdomen or pelvis). There may be obstructive oedema and infiltration from scar tissue about the pubic arch (stasis hypertrophy), or oedema and infiltration from obstruction of vessels by filaria (elephantiasis).

The swelling may be a pudendal hernia, which originates either as an inguinal or a vaginal hernia.

The swelling may be a retention cyst, the most common of which is cyst of the vulvo-vaginal gland. For complete enumeration and **differential diagnosis** of vulvar swellings see chapter II (page 181) and chapter IV (page 419).

NEW GROWTHS ABOUT EXTERNAL GENITALS.

Condyloma, Urethral Caruncle, Lipoma, Fibroma, Malignant Growths.

Condylomata are small papillomata, from pin-head to hazel-nut size, that appear about the labia and meatus as the result of chronic irritation. They are seen most frequently in gonorrhoea and secondary syphilis. Occasionally condylomatous growths unite to form a large mass, as shown in chapter II (page 198).

Caruncle is a papilloma occurring about the meatus. Usually it is extremely tender.

Fibroma, lipoma and other non-malignant tumors are rare, although they do occur occasionally, fibroma being the most frequent.

Malignant growths in this situation very rapidly reach the stage at which complete extirpation is impossible, hence the importance of recognizing the condition very early.

CONDITION OF HYMEN.

Intact, Lacerated, Destroyed.

Does the hymen present the virginal appearance, or is it lax and the opening large, as from sexual intercourse, or is it destroyed from labor, being represented by only a few remnants (carunculae myrtiformes)?

CONDITION OF PERINEUM.

Wide Opening, Vaginal Walls Visible, Shallow Perineum, Scar Tissue, Fistula.

For the detailed diagnosis of lacerations see chapter II (pages 186, 474).

VAGINAL EXAMINATION (DIGITAL).

In the vaginal examination, or digital examination, as it is frequently designated, one or two fingers are introduced into the vagina and the structures within reach are palpated. In this way valuable information may be obtained in certain cases. It is also a preliminary step to the important vagino-abdominal or bimanual examination, to be taken up later.

Method of Examination.

Use **two fingers** for the vaginal palpation where the size of the vaginal opening will permit. A much deeper and more accurate examination can be made with both the index and middle finger, than with the index finger alone. Ordinarily in the examination of a married woman, even one who has had no children, two fingers may be introduced without difficulty, provided the fingers are well lubricated and care is taken to cause no pain.

It is important also to separate the labia with the fingers of the other hand while the examining fingers are being introduced, for, if the hair and labia are allowed to roll in with the examining fingers, much pain is caused the patient and the opening is considerably narrowed.

In cases where there is any venereal disease or purulent discharge, and also in cases where it is uncertain whether or not such will be encountered, **rubber gloves** are convenient and advisable. When intact, they give complete protection against syphilis or other infection which might come through an unnoticed abrasion about the fingers. Another advantage is that less scrubbing of the hands is needed after the examination. Frequent severe scrubbing of the hands and the use of strong antiseptic solutions keep the skin in an irritated, unhealthy condition, particularly in cold weather. When rubber gloves are used, all the infectious material is removed with the gloves, which are boiled and are then ready for the next examination.

Fig. 52 shows the **position of the fingers** ordinarily preferable in the vaginal and bimanual examinations. Fig. 53 shows the hand gloved and ready for the vaginal examination. Fig. 54 shows the disposition of the outside fingers and the thumb as the examination is being made. The third and fourth fingers are folded into the palm of the hand as far as possible, and care is taken to maintain extension of the thumb, so that it does not infringe upon the genitals in the region of the clitoris. For the same reason, in the deep internal palpation the wrist should be dropped low and the examining fingers directed upward, so as to throw the thumb away from the genitals. In the very deep palpation in the sides of the pelvis, when the thumb is necessarily in the way, it should be turned far to one side or the other, and thus kept from contact with the sensitive areas (Fig. 80). In regard to the disposition of the third and fourth fingers, it is advantageous in some cases, particularly in very stout patients, to extend these fingers along in the internatal fold, as shown in Fig. 64. In these exceptional cases this permits deeper penetration of the examining fingers.

In beginning the examination, as the examining fingers are being introduced, there is frequently a tendency on the part of the patient, who is nervous for fear of pain or uncertain as to whether there will be pain, to contract the muscles of the pelvic floor and thus interfere with the vaginal

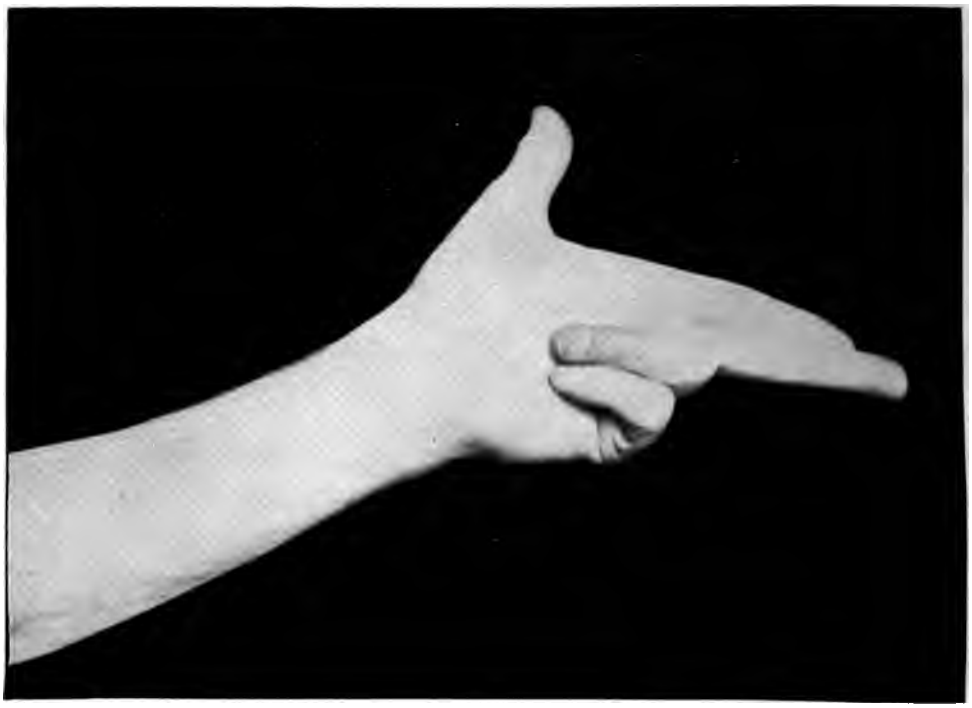


Fig. 52. Position of the fingers for the vaginal and vagino-abdominal examinations.

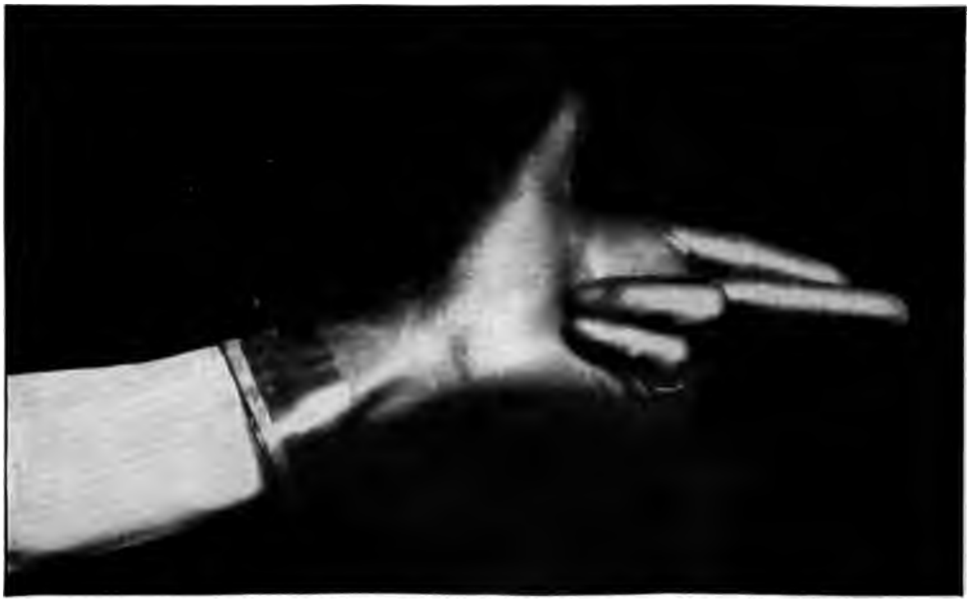


Fig. 53. Same hand, gloved and ready for the examination.

examination. In such a case, if one finger be introduced a short distance and steady **pressure backward** be made against the muscle (Fig. 92), it slowly relaxes and the second finger may be introduced beside the first. Remember, that to obtain more space at the vaginal orifice, either in digital examination or in introducing a speculum, always press downward against the pelvic sling. Above and to the sides of the opening is the bony arch (Fig. 55), and if an attempt is made to overcome the resistance by direct forward pressure, without depressing the perineum, the soft tissues above are pinched between the finger or instrument and the bony arch, causing the patient pain and increasing the muscular resistance.

In a woman who has borne children the opening usually admits the two fingers somewhat easier, and the temporary muscular resistance above mentioned is seldom encountered.

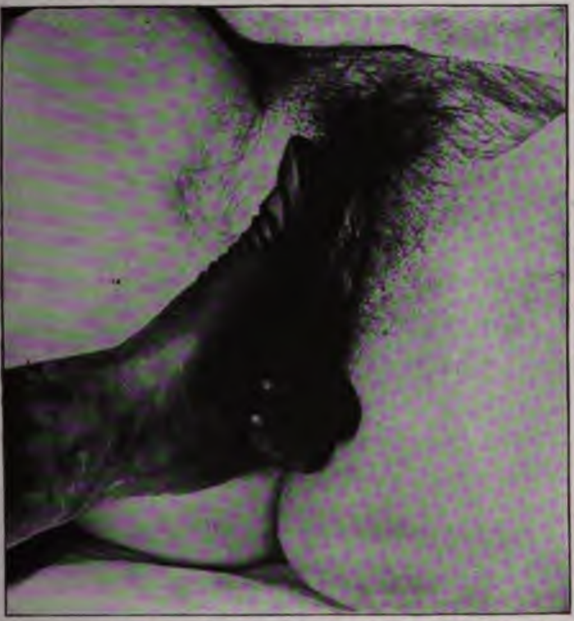


Fig. 54. The gloved hand making the vaginal examination. The thumb is held away from the genitals, and the third and fourth fingers are folded into the palm.

What Structures to Palpate.

With one or two fingers, well lubricated and introduced into the vagina, palpate the following structures:

Vaginal Walls—Roughness, Tenderness, Discharge, Induration, Swelling, Stricture.

Base of Bladder—Tenderness, Induration.

Urethra—Tenderness, Induration, Discharge.

Vulvo-vaginal Glands—Tenderness, Induration, Discharge, Red Spot.

Pelvic Floor
- Size of opening,
- Resistance to backward pressure,
- Protrusion of vaginal walls,
- Scars and distortions,
- Thickness of perineum.

Rectum—Tenderness, Induration, Hemorrhoids, Fistula, Fissure.

Cervix Uteri
- Position,
- Size and shape,
- Consistency,
- Tenderness,
- Mobility,
- Direction of canal,
- Laceration and Eversion of Lips,
- Size and shape of External Os.

Pericervical Tissues—Tenderness, Induration.

VAGINAL WALLS.

Roughness, Tenderness, Induration, Swelling, Stricture.

In acute vaginitis and in some cases of chronic vaginitis the surfaces within the vagina have a rough, granular feel and are tender on pressure. An astringent douche—for example, a bichloride douche, or one containing zinc sulphate or tannic acid or alum—will cause a similar **roughness.** But if the vagina is both rough and **tender,** it is almost certainly inflamed, providing the tenderness is not due to some peri-vaginal trouble. Of course, the diagnosis of vaginitis does not depend on this alone, but is aided by facts determined in the speculum examination, and also by the history of the case.

When discharge is felt in the vagina, the assumption is that it comes from the uterus unless there are indications of inflammation in the vagina. If the vagina is roughened and tender, the discharge probably originates there. Whether or not it really does originate there, is determined in the speculum examination.

Induration, or a hard place felt at some part of the vaginal wall, may be due to infiltration of the wall itself (inflammation, scar tissue, small cyst, malignant disease) or to some trouble back of the wall.

A **swelling** or mass in the vaginal wall or bulging into the vagina from any direction may be due to any one of a number of conditions which are mentioned in detail in chapter II (page 189).

A **stricture** (narrowing) or atresia (occlusion) of the vaginal canal may be a congenital malformation or may be an acquired condition resulting from injuries, in labor or otherwise, or from severe or protracted inflammation, as in the adhesive or obliterative vaginitis seen frequently in aged patients. The narrowing of the canal may be due also to pressure of a tumor or an inflammatory mass around the vagina.

BASE OF BLADDER.

Tenderness, Induration.

The base of the bladder lies directly beneath the central part of the anterior ginal wall and is readily palpated. In cystitis or other painful affection olving the base of the bladder, **tenderness** is found. When **induration** or ormal hardening or thickening is found, ascertain whether it is a distinct s with definite outlines (foreign body or tumor of the bladder), or a dif- infiltration (inflammatory, tubercular, malignant) of the bladder wall f the vesico-vaginal septum.

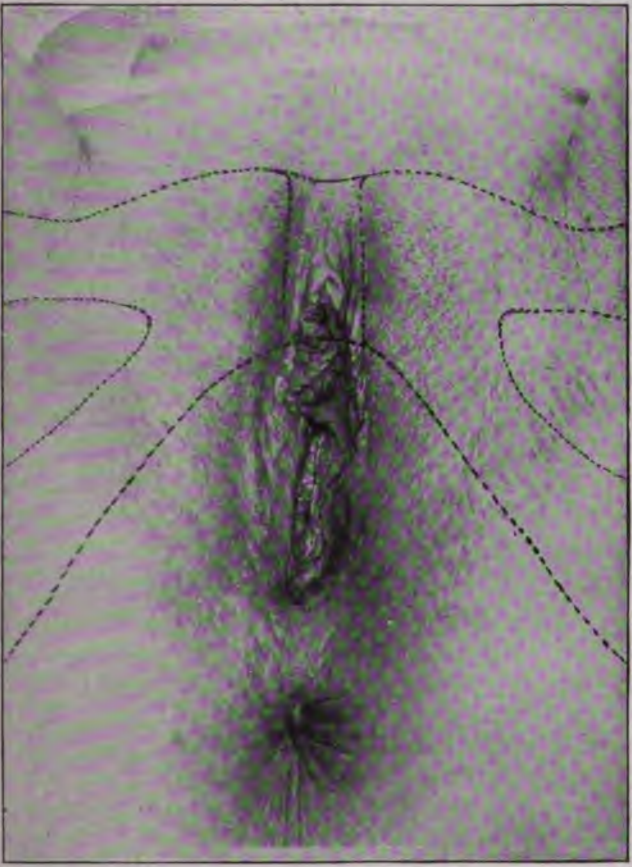


Fig. 55. The bony arch, which bounds the vaginal opening above.

URETHRA.

Tenderness, Induration, Discharge.

he urethra, as it extends from the bladder forward under the pubic arch, asily palpated through the anterior vaginal wall, immediately beneath which it lies. In inflammation of the urethra there is usually considerable **tenderness**, and, in many cases, decided **induration** or thickening. A thickening due to a new growth may be easily outlined in this way. Palpate the urethra from within outward—i. e., from the bladder toward the meatus. The palpation is more accurately and conveniently accomplished in that way, and at the same time any **discharge** in the urethra is carried to the meatus, where it is seen and a specimen secured for microscopic examination.

Remember that inflammation may persist indefinitely in Skene's glands, just within the meatus. To secure secretion from the glands for examination in such cases, introduce the index-finger within the vagina and compress the urethra just back of the meatus, and then move the finger forward. In parous women the opening of each gland may often be found by rolling out the urethral mucosa slightly and examining closely for the opening (Fig. 48).

VULVO-VAGINAL GLAND.

Tenderness, Induration, Discharge, Red Spot.

The vulvo-vaginal gland (gland of Bartholin) of each side lies just lateral to the remnants of the hymen, and opens by a short duct in front of and a little below the middle of the lateral margin of the hymenal attachment. A convenient way to palpate the glands is to catch the tissues lateral to the gland opening (the opening may be easily seen in the situation just described) between a finger in the vagina and the thumb outside (Fig. 51).

When normal, the gland is scarcely noticeable by ordinary palpation. When inflamed, however, there is **thickening**, and the gland is felt as a small firm nodule.

There is **tenderness** also, and, if the gland is pressed upon, some **discharge** (pus) may appear from duct. Make a smear preparation of this for staining for gonococci.

In a case of abscess or cyst the nodule will be much larger. A well-marked red spot or small red area involving the opening of the gland duct indicates previous inflammation of the duct, and is presumptive evidence of a previous gonorrhoeal infection (as other forms of inflammation seldom involve the gland or duct), and should always lead to further investigation, to establish the presence or absence of this disease.

PELVIC FLOOR.

Size of Vaginal Opening, Resistance to Backward Pressure on Pelvic Floor, Protrusion of Vaginal Walls, Scars or Distortions, Thickness of Perineal Body.

Is there loss of support at the pelvic **outlet?** I **tion.**
due to imperfect healing of an **open tear** or
subinvolution of the pelvic sling, that the
supported? To determine this, investig

Size of Vaginal Opening. In the adult virgin the opening in the hymen will usually admit the little finger without much stretching. In a married woman two fingers can usually be introduced for examination without causing pain, provided the care previously mentioned is exercised.

If the vaginal opening will readily admit three fingers, it is decidedly enlarged and there is considerable interference with the integrity of the perineal body. The perineal body is not, however, an important factor in the real supporting power of the pelvic floor; hence a relaxed vaginal opening does not necessarily mean a relaxed pelvic sling, though it usually accompanies the same.

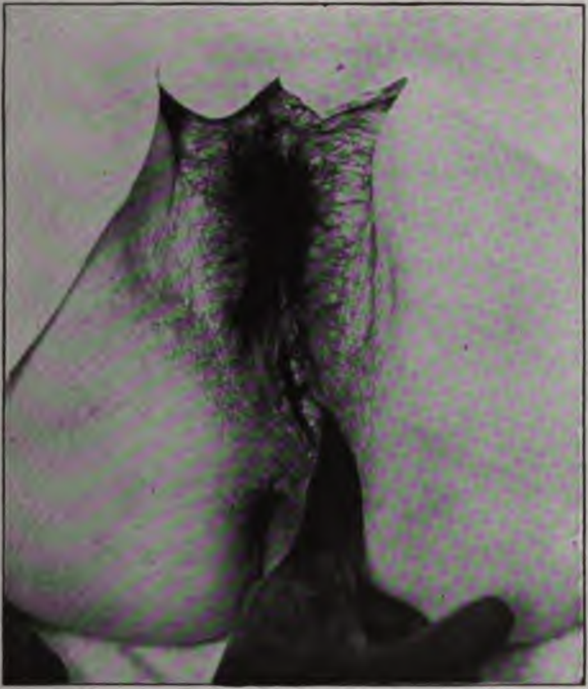


Fig. 56. Testing the left sulcus.

Resistance to Downward and Backward Pressure on the Pelvic Floor. Usually in the woman who has borne children there is not the firm support back of the posterior vaginal wall, and extending well up toward the cervix, that is found in nullipara. There is not, however, the marked difference one would naturally expect from the enormous stretching that necessarily takes place in childbirth.

The provisions of nature for the restoration of the parts to near their former condition are wonderfully effective when not interfered with by tears or over-stretching or subinvolution.

The resistance in each sulcus may be tested with one finger, as shown in

Fig. 56, to determine if there has been a tear in the levator ani in that region, with consequent relaxation.

A much more satisfactory method of testing the integrity of the pelvic floor is to introduce the two examining fingers and turn them so that their palmar surfaces are directed backward. Then press backward and downward on the pelvic floor, at the same time separating the fingers as widely as possible (Fig. 57).

The fingers in the vagina are separated as shown in Fig. 58. This maneuver will give a very good idea of the amount of support furnished by the pelvic sling and of the downward displacement of the pelvic organs that is permitted when the patient is standing. Another useful method is to introduce the two index fingers, side by side, into the vagina and then separate them widely in a direction downward and outward (Fig. 59). If the fingers can be carried to the bony sides of the arch with but little muscular resistance, the front part of the levator ani muscle and accompanying fascia has been torn, and there is decided loss of support in the pelvic floor. If now the patient be directed to bear down, the loss of support becomes still more evident.

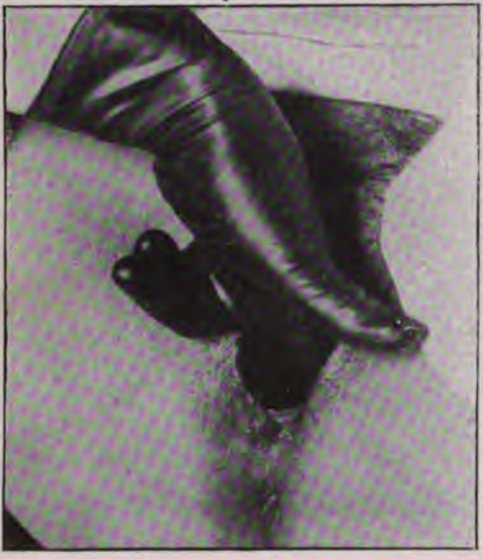


Fig. 57. Testing the pelvic floor. The vaginal fingers are separated widely, as explained in Fig. 58, and pressed downward.

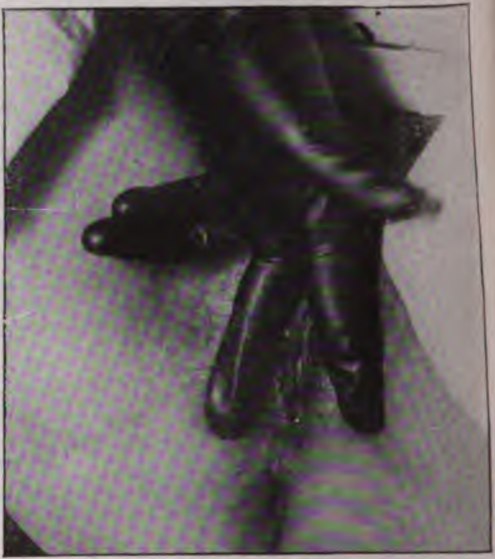


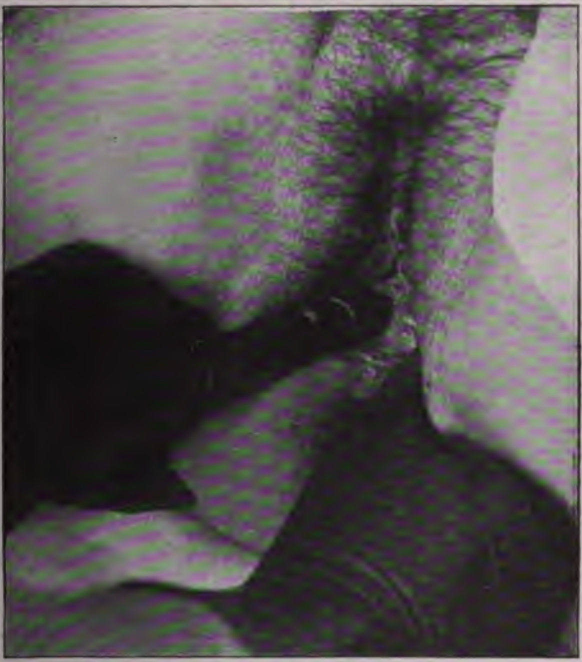
Fig. 58. Showing the relative position of the fingers when in the vagina, while testing the pelvic floor.

Occasionally, even in case of marked injury to the pelvic sling, the support will seem very good during the first part of the examination because of the muscular tension.

The strong fascial layer of the pelvic sling probably con
cipal factor in continuous support, for the muscl
ously.

w, the fascia may be so torn and stretched that it furnishes little or no nuous support, and yet, as long as the muscles stay contracted, there s to be a fairly good pelvic floor. Any error in this respect may be led by watching for it, and securing entire relaxation before the exami- n is finished.

otrusion of Anterior or Posterior Wall. To further test the loss of sup- separate the labia and instruct the patient to bear down. The resulting ing of the structures gives some idea of how poorly the pelvic floor sup- the organs, provided the patient really bears down when she thinks she The downward displacement of the vaginal walls and pelvic diaphragm be still further shown by introducing the two examining fingers and



ig. 59. Testing the pelvic floor by the two index fingers, introduced together and then separated.

sing backward and downward, at the same time separating the fingers ly, as mentioned in testing the strength of the pelvic floor.

hen the patient is in the upright posture, this downward displacement e vaginal wall is of course more marked, particularly in cases of pro- rinal walls. But it is rarely necessary to examine a posture, for the diagnosis as to the character and usually be made without it.

Vaginal Wall or Perineum. Sometimes there are ginal wall at the site of tear, indicating a severe injury of the pelvic sling. These scars may extend out onto the perineum and be seen in the inspection already mentioned.

Thickness of Perineal Body. The thickness of the perineum remaining may readily be determined by catching the perineal tissue between the finger in the rectum and thumb in the vagina. A membraneous perineum (torn internally, but not much on the skin surface) may be demonstrated by examining with a finger in the vagina and the thumb outside over the perineum.

RECTUM.

Tenderness, Induration, Hemorrhoids, Fistula, Fissure.

Above the perineum the anterior rectal wall is closely applied to the posterior vaginal wall. Turn the examining fingers so that the palmar surfaces are directed backward, and palpate the rectum (Fig. 60). If there is any painful affection in that portion of the rectum, there will be decided **tenderness.** If an **induration** is felt, determine whether it is a distinct **mass with** definite outlines (foreign body, fecal material, tumor in rectum), or a **diffuse infiltration** (inflammatory, syphilitic, tubercular, malignant). Very frequently firm fecal masses will be felt through the posterior vaginal wall. Sometimes these are large enough to cause a bulging of a part of the wall, while in exceptional cases they are so large as to interfere decidedly with bimanual examination. In the lower part of the rectum these masses cause no trouble in diagnosis, for in that situation their character is easily recognized. In the upper part of

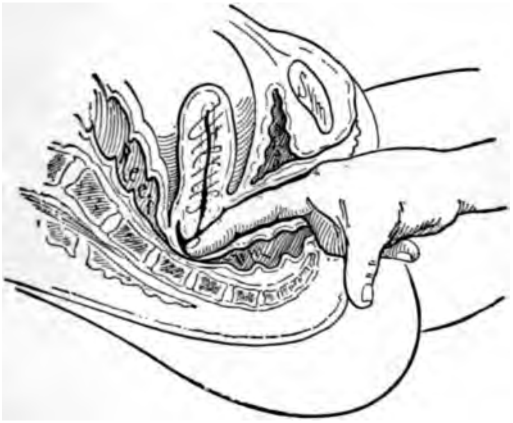


Fig. 60. Palpation of rectum through posterior vaginal wall. (Ashton—*Practice of Gynecology.*)

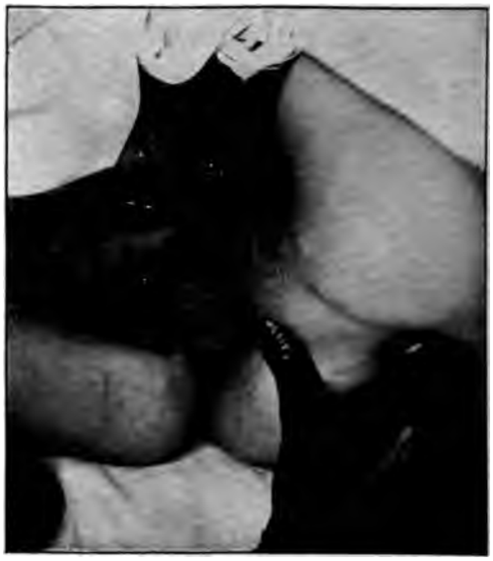


Fig. 61. Method of everting the anal tissues for inspection.

the rectum, however, and in the sigmoid region such a mass may cause confusion in diagnosis, for it may resemble a prolapsed ovary or an inflammatory mass in the cul-de-sac or about the tube.

The distinguishing characteristics of a **fecal mass** are three: (a) it is not particularly tender, (b) it has usually a putty-like consistency and may be dented, the dent remaining, and (c) it may sometimes be pushed along to a different position in the bowel. In a doubtful case the bowels should be moved thoroughly by a purgative and the rectum cleared with an enema, and the patient again examined.

In a patient with a lax pelvic floor the anal tissues may be everted by pressure from within the vagina by one or two fingers, as indicated in **Fig. 61.**

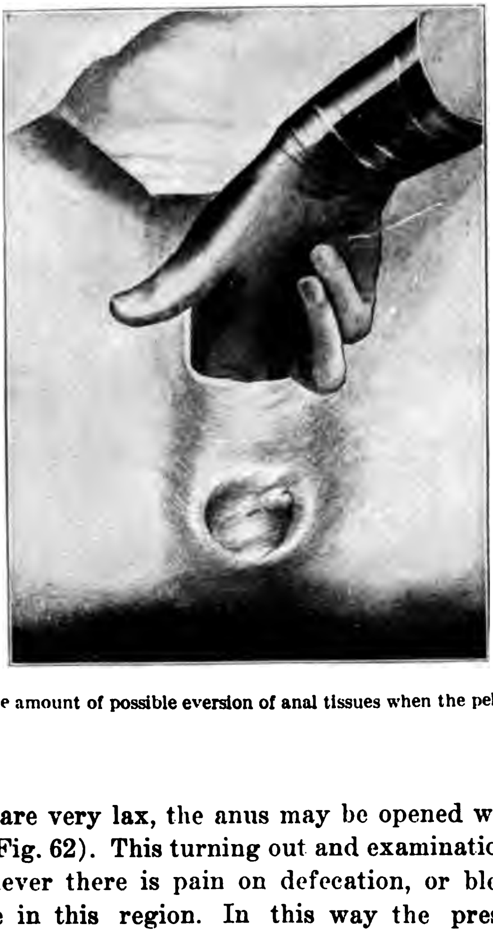


Fig. 62. Indicating the amount of possible eversion of anal tissues when the pelvic floor is lax (Dudley—*Practice of Gynecology*.)

When the tissues are very lax, the anus may be opened widely and the rectal mucosa exposed (Fig. 62). This turning out and examination of the anal tissues is advisable whenever there is pain on defecation, or bleeding or other evidence of trouble in this region. In this way the presence or absence of **hemorrhoids** or **fistula** or **fissure** may be determined.

CERVIX UTERI.

Position, Size, Shape, Consistency, Tenderness, Mobility, Attachments, Direction in Which it Points, Laceration with Eversion of Lips, Size and Shape of External Os.

The cervix uteri is felt at the upper end of the vagina as a firm, conical body, projecting through the upper portion of the anterior wall (Figs. 1 and 3). It is distinguished from the surrounding vaginal wall by its greater hardness.

Position of Cervix. The normal position of the cervix is from three to three and one-half inches from the vaginal orifice. The fingers are carried toward the top of the vagina until the tip of the finger touches the cervix. If the vaginal orifice comes well up to the upper end of the third joint of the finger, the cervix is in normal position (I assume a hand of average size, with index finger about three and three-fourths inches long). If the cervix is encountered by the finger before it is introduced that far, the cervix is too low. If not encountered at that point, it is too high. The diagnostic significance of abnormal position of the cervix is given in chapter II (page 231).

In cases where, after examination in the dorsal posture, it is still uncertain as to whether or not there is serious descent of the uterus, the patient may be examined in the standing posture. The patient stands, with one foot slightly elevated, on the round of a chair or on a small stool, while the examiner, sitting on a chair in front of her, makes the vaginal examination. In this posture a decided descent of the uterus, which might disappear when the patient lies down, is at once appreciable. Examination in this position is employed also to detect the ballottement of early pregnancy in doubtful cases. Examination in this posture, however, is rarely required, for in almost all cases the information necessary to a diagnosis may be obtained by the more common methods of gynecological investigation.

Size and Shape. The size and shape of the cervix varies much in different individuals, and in the same individual at different periods of life. In women who have never been pregnant the normal cervix has the shape of a rounded cone about one inch wide, and projects into the vagina from one-half to three-quarters of an inch. The external os is small and round, and is at the flattened apex of the cone.

In certain abnormal cases the cervix is very long (an inch to an inch and a half) and pointed. This condition is known as conical cervix. It is frequently accompanied by a very small external os ("pinhole os"), and is one cause of sterility.

In women who have borne children the cervix is larger and broader, and comparatively shorter. The os is a transverse slit and is irregular in shape, and may be large enough to admit the finger-tip. There are usually small scars and irregular depressions from lacerations in labor. When the cervix has been severely lacerated, there may be two or three distinct lips. Again, it may, on account of chronic inflammation, become enlarged to two or three times its normal size and may be felt as an irregular ball at the top of the vagina.

Consistency. The normal cervix is like hard connective tissue, almost as hard as tendon. Its consistency is closely approached by that of the end of the nose when firmly pressed upon. During pregnancy the cervix **softens,** the softening beginning at the lower end and gradually involving more and more as pregnancy advances. The softening is so marked that the softened portion is sometimes missed entirely, the cervix being apparently simply shortened. This is what gave rise to the former idea that the cervix became gradually shortened as pregnancy advanced. The softened portion feels like thick velvet or a fold of vaginal wall as it slips back and forth beneath the examining finger. It is hard to describe satisfactorily, but when once felt is easily recognized afterward. A partial idea of it may be secured by the following experiment. Cover a finger with a piece of heavy velvet with a very thick nap, the nap side out. Then shut the eyes and with the other hand, with the fingers usually used in vaginal examination, endeavor to make out exactly the thickness of the nap by passing the fingers over it with varying pressure and in different directions. First make firm pressure so as to appreciate the fingers beneath, then make light pressure so as to estimate the thickness of the nap. These same maneuvers are carried out in appreciating the presence and extent of marked softening of the cervix.

This softened velvety condition of the cervix is very characteristic and should always arouse suspicion of pregnancy. Some softening of the cervix is found in certain cases of inflammation of the cervix, and also in cases where its circulation is interfered with, as when the pelvis is filled with a tumor or with a mass of inflammatory exudate, or where there is marked displacement of the uterus.

Abnormal **hardening** of a portion of the cervix may be due to scar tissue, to cystic disease, to a fibroid nodule or to malignant infiltration.

Tenderness of Cervix. The cervix is much less sensitive than the vaginal wall, and rarely becomes very sensitive even when diseased. The pain complained of when the cervix is pressed upon is usually due to the pulling upon inflamed periuterine structures, by the resulting movement of the uterus.

Mobility of Cervix. Normally the cervix is freely and painlessly movable for a short distance in all directions. Its range of mobility may be diminished by scar tissue or by malignant infiltration in the upper part of the vagina, or by an inflammatory exudate in the pelvis, or by a uterine tumor or by any pelvic tumor that fixes the uterus. Its range of mobility may be increased by laceration or overstretching of the supports, posteriorly or anteriorly or laterally, a frequent accompaniment of pelvic floor injuries.

Attachment of Cervix. Is the cervix attached or fixed to the pelvic wall at some point? If so, where and by what?

Direction of Cervix. Does the cervical canal—i. e., the axis of the cervix—point **across** the vagina, about toward the coccyx, as it should (Figs. 1 and

3)? When you find the cervix pointing **along** the **vagina toward you, do not** jump at the conclusion that there must be a **backward displacement** of the uterus. It may be that other rather common condition—**anteflexion** of the cervix.

Laceration of Cervix, Eversion of Lips. The presence or absence of this condition is determined when ascertaining the size and shape of the cervix. For the various conditions thus produced see chapter II (pages 292 to 294).

Size and Shape of External Os. These items are determined by palpation of the os when ascertaining the general size and shape of the cervix. The various conditions of the external os are shown in chapters II and VI (pages 291, 237).

PERICERVICAL TISSUES.

Tenderness, Induration.

The tissues about the cervix, immediately beneath the vaginal wall, may be palpated, and tenderness or induration noted. If induration is present, note whether it is a distinct well-defined mass or diffuse infiltration and thickening of the tissues.

VAGINO-ABDOMINAL EXAMINATION (BIMANUAL).

The vagino-abdominal examination is, as its name implies, an examination from the vagina and the abdomen at the same time. The pelvic structures are caught between the fingers in the vagina and the fingers over the abdomen, and carefully examined by indirect touch (Figs. 63, 64). By it the body of the uterus is located and outlined. The region to each side of the uterus is palpated and also the space back of the uterus. It is determined if there is any abnormal mass in the pelvis or if there is any area of marked tenderness.

To the beginner in gynecological work this important bimanual examination is often unsatisfactory. He has heard a great deal about tubal and ovarian disease, and he expects to feel the tube and ovary at once. He examines a patient, or several patients, and can feel neither tube nor ovary if they are normal. Then he is discouraged, and thinks that he has learned nothing from the examination. And probably he has not learned much, for the simple reason that he was feeling for something that he could not feel, and did not know the significance of what he did feel. Close attention to the details of the examination will prevent this unprofitable experience.

The information concerning the Bimanual Examination may be divided as follows:

Palpation of Uterus—Position, Size, Shape, Consistency, **Tenderness**, Mobility, Attachments.

Palpation of Tubo-ovarian Region—Tenderness, Mass or **Induration.**

Palpation of other Regions—Tenderness, Mass or **Induration.**

General Observations—Importance of the Educated Touch, Train One Hand, Use Two Fingers, Examine Deeply in Pelvis, May Draw Down Uterus, Preferable Position for Examiner, Conditions in Different Patients, Get Intestines out of the Way, Diminish Tenderness.

PALPATION OF BODY OF UTERUS.

Position, Size, Shape, Consistency, Tenderness, Mobility, Attachments.

LOCATING THE CORPUS UTERI.

Steps. The locating of the corpus uteri will be much facilitated by proceeding as follows:

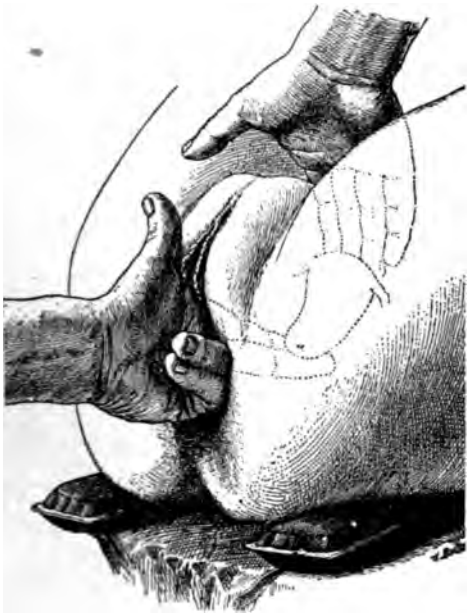


Fig. 63. Bimanual Examination, showing also the disposition of outside fingers and left thumb. (Kelly —*Operative Gynecology*.)

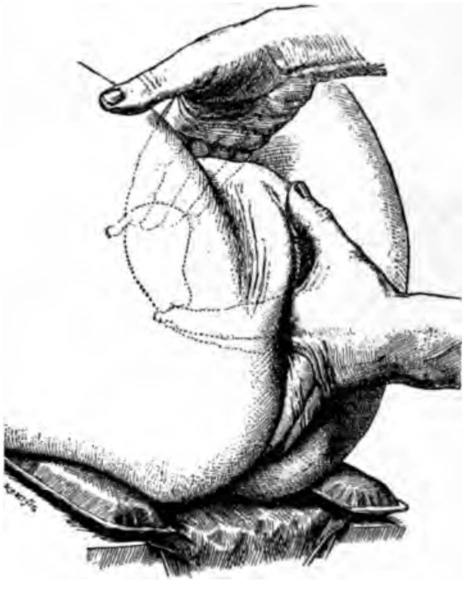


Fig. 64. Showing the other disposition of third and fourth fingers along the gluteal crease. This allows deeper penetration of the examining fingers in certain exceptional cases, particularly in very stout patients. (Kelly—*Operative Gynecology*.)

1. With two fingers in the vagina, locate the cervix and then push the cervix backward and upward.

2. Then, with the fingers of the abdominal hand depressing the abdominal wall into the depth of the pelvis back of the uterus, bring the fundus uteri well forward.

3. Then, with the pressure still maintained in the direction indicated, slip **the vaginal fingers in front of the cervix** (Fig. 65). The body of the uterus is **thus caught firmly between the fingers** below and above, and may be clearly **felt and outlined.**

Two Common Errors. The following errors are made so often by students and practitioners that I think it advisable to call particular attention to them.

Error 1. Depression of the Abdominal Wall too Close to the Pubes. If the uterus happens to be far forward, this causes no trouble, but if the uterus is very high, as it frequently is from a few hours' urine in the bladder or other normal or abnormal cause, the depression of the wall close to the pubes tends to push the uterus backward (Figs. 66, 67). Consequently it is not felt between the examining fingers, though there is no real displacement, or was none before this examination was begun.

To **avoid this error,** depress the abdominal wall near the promontory of the sacrum, about midway between the pubes and the umbilicus (Fig. 68). In particularly difficult cases it is well to start very high and bring the fingers down upon the sacral promontory, and then allow them to slip over the promontory into the posterior part of the pelvis. They are then brought forward until the body of the uterus is felt or until the vaginal and abdominal fingers are so closely approximated that the absence of the uterus from that part of the pelvis is demonstrated.

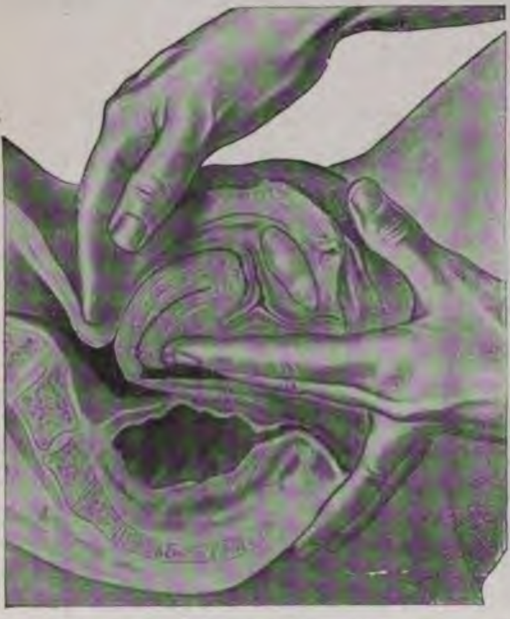


Fig. 65. Showing the third step in the palpation of the uterus. (Montgomery—*Practical Gynecology.*)

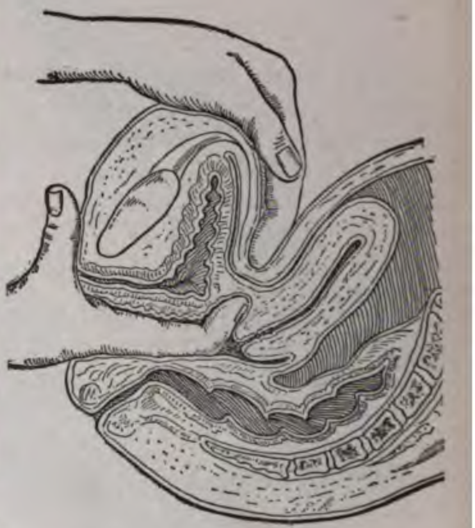


Fig. 66. Depression of the abdominal wall too close to pubes. Sectional view. (Ashton—*Practice of Gynecology.*)

Error 2. Frequent Shifting of the Position of the Abdominal Fingers. Some students gouge about in the lower abdomen in various directions in an effort to feel the fundus uteri with the abdominal fingers. This is likely to make the examination a failure in a normal case and it is almost certain to do so in a difficult case. Remember that tension of the abdominal wall interferes with the examination and may defeat it entirely. Remember also that the tension is increased by frequent movements of the abdominal fingers, such as placing them in one position after another in rapid succession, and particularly by endeavoring to gouge in rapidly and forcibly in various parts of the pelvis in an endeavor to overcome the resistance of the wall. Keep in mind that most of the effective palpation is done with the vaginal fingers, the principal function of the abdominal fingers being to bring the body of the uterus within reach of the vaginal fingers and then hold it there while palpation is being carried out. Get clearly in mind just exactly what movements are necessary to best palpate the uterus.

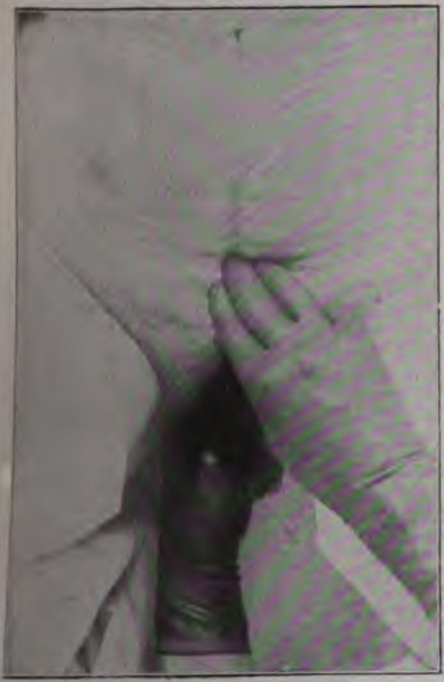


Fig. 67. Depression of abdominal wall too close to the pubes. Outside view.

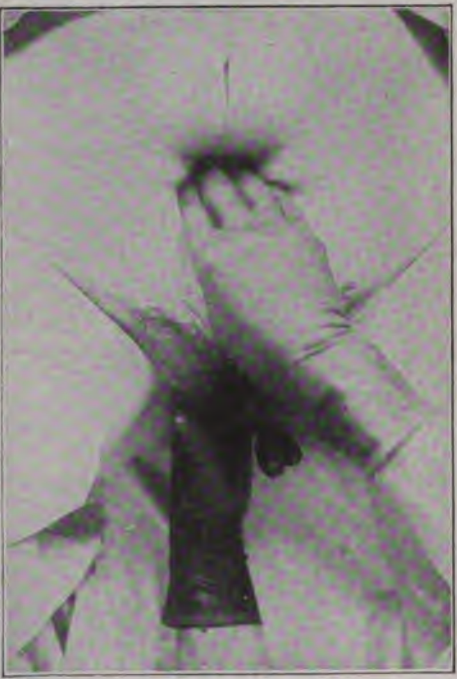


Fig. 68. Depression of abdominal wall at the proper height.

In order to **avoid this error** just mentioned, place the abdominal fingers so that the depression of the wall will be into the back part of the pelvis, and then carry the fingers by steady and continuous pressure toward the desired region. When you have advanced the fingers as far as possible, hold them there steadily and direct the patient to take a deep breath and then to let the breath all out. As expiration takes place, the fingers may be carried deeper into the pelvis—not by any sudden forcing movement, but by strong steady pressure that does not excite muscular contraction and resistance. If still the fingers are not deep enough in the pelvis, the same movements may be re-

peated several times. Because the uterus is not felt at once, do not cease the pressure there and begin to depress the wall at some other place. Start the fingers in the right direction at first and then keep them going in that direction steadily, firmly, persistently, without relaxing the pressure, until the depth of the pelvis is reached and the uterus felt.

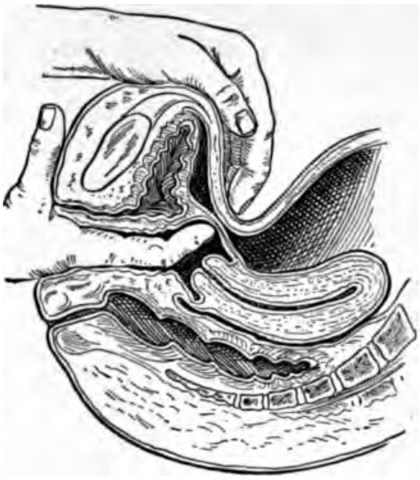


Fig. 69. Explaining one condition in which the uterus is not found in the front part of the pelvis. (Ashton—*Practice of Gynecology*.)

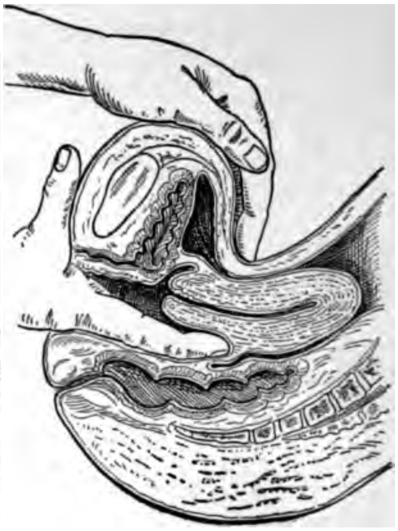


Fig. 70. Search is then made in the posterior part of the pelvis, and the uterus is found in retroversion. (Ashton—*Practice of Gynecology*.)

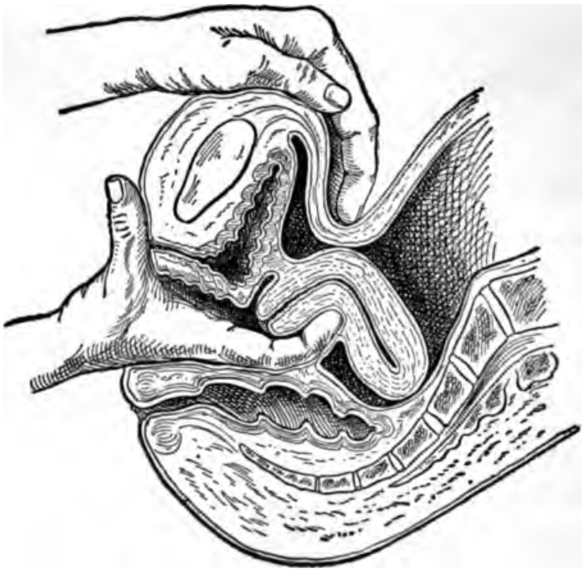


Fig. 71. Indicating the examination findings when the uterus is in retroflexion. Notice the marked angle which is palpable posteriorly at the junction of the cervix and corpus uteri. (Ashton—*Practice of Gynecology*.)

In the subsequent steps of the palpation of the uterus the slight movement of the abdominal fingers that is necessary to bring them in position for good counter-pressure at the various parts of the uterus may usually be made without relaxing the pressure, as the skin is loose enough to be slipped about over the underlying structures.

If the body of the uterus is not found in front of the cervix (Fig. 69), then search behind the cervix (Figs. 70, 71) and then to each side of it. If the patient has no mass obstructing the pelvis and no extreme tension of the abdominal wall, the body of the uterus should be distinctly made out.

Facts to Determine.

When the body of the uterus has been located, then fix in mind the following facts concerning it:

1. **Position of the Corpus Uteri.** Is it in anterior position, as it should be, or is it displaced backward or drawn to one side?
2. **Size of Corpus Uteri.** Is it apparently normal in size (about three inches long), or is it as large as the fist, or as large as a child's head? Figs. 72 and 73 indicate the method of palpating the margin of the uterus and also the method of determining its width by separation of the vaginal fingers.
3. **Shape of the Corpus Uteri.** Is it approximately pear-shaped and of regular contour, or is it distorted by fibroids or other tumors?
4. **Consistency of Corpus Uteri.** Is it apparently a firm, solid body or does it contain fluid, or are there hard nodules in it, or is there marked softening?
5. **Tenderness of Corpus Uteri.** Does pressure on the uterus cause pain or does the attempt to move it cause pain?
6. **Mobility of Corpus Uteri.** Can the uterus be moved freely up and down, to right and left, forward and backward, or is it fixed more or less firmly by an inflammatory exudate or by a tumor?
7. **Attachment of Corpus Uteri.** Does the uterus seem to be attached or fixed to the pelvic wall at some point? If so, where and by what?

When it is impossible to reach the various parts of the uterus sufficiently to obtain the necessary information, the cervix may be caught with a tenaculum forceps and the uterus pulled somewhat downward (Fig. 74). Care should be taken, however, not to pull the uterus down very far, for reasons explained later (page 71).

PALPATION OF LATERAL REGIONS OF PELVIS.

Tubes and Ovaries, Mass, Induration, Tenderness.

In this region, on each side, lies the large area of connective tissue, beside the cervix and lower part of the corpus uteri. Here induration from inflammation or other cause is felt at once, low about the cervix, just under the vaginal wall. Higher, beside the uterus, lie the Fallopian tube and the ovary. They are near the upper part of the broad ligament and so close together that ordinarily it is impossible to say, simply from the position of a mass there, whether it springs from the tube or from the ovary. Hence the region is spoken of as the "tubo-ovarian" region, as both organs lie there. The tubo-ovarian region lies high, and to palpate it satisfactorily requires special care.

Steps in Palpation of the Lateral Regions.

In palpating the tubo-ovarian region of the left side, proceed as follows:

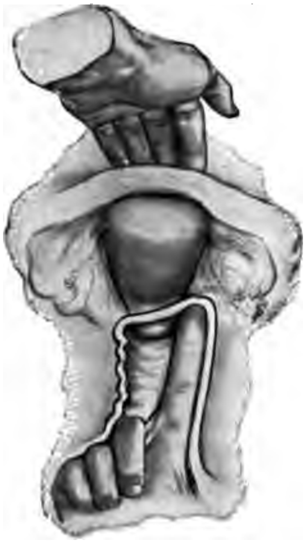


Fig. 72. Palpating the margin of the uterus, to determine enlargement or irregularity. (Edgar—*Practice of Obstetrics.*)

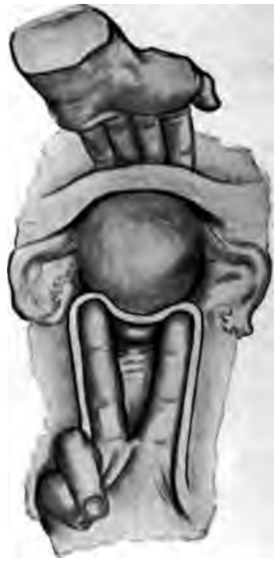


Fig. 73. Estimating the width of the uterus by separating the vaginal fingers so that one goes to each side of the uterus. (Edgar—*Practice of Obstetrics.*)

1. Place the tips of the vaginal fingers to the left side of the cervix, and then push them backward and outward and upward as far as possible.

In order to carry the finger-tips sufficiently far into the posterior lateral area of the pelvis, it is necessary to push the perineum for some distance into the pelvis. This is best accomplished usually by utilizing the force of the body muscles, transmitted to the elbow either through the knee (Figs. 75, 76), with the foot on a small stool, or through the iliac crest (Fig. 77). This leaves the arm muscles free for the deep delicate manipulation necessary to accurate palpation of the pelvic contents.

2. With the abdominal fingers locate the anterior superior spine of the ilium on the left side and then bring the fingers directly inward (not downward toward the pubes, but directly inward or slightly upward) toward the median line for about two inches (Fig. 78).

3. Then, at that point, depress the abdominal wall into the posterior part of the side of the pelvis (Figs. 79, 80) until the tips of the abdominal fingers come close to the tips of the vaginal fingers. This brings the fingers near to each other **back** of, or at least in the region of, the tube and ovary (Fig. 81).

4. If the adnexa are not felt in the back part of the pelvis, then bring the fingers of the two hands, held in the same relation to each other, slowly downward toward the pubes (Fig. 82). In this way the tube and the ovary are made to pass between the examining finger-tips and may be felt if decidedly enlarged. The fingers are then carried on downward and toward the median line in order to palpate the front part of the pelvis.

By proceeding gently, so as not to excite contraction of the abdominal muscles, and at the same time steadily pressing the two sets of fingers toward each other, a little with each expiration, the finger-tips may be brought almost together in the various parts of the pelvis.

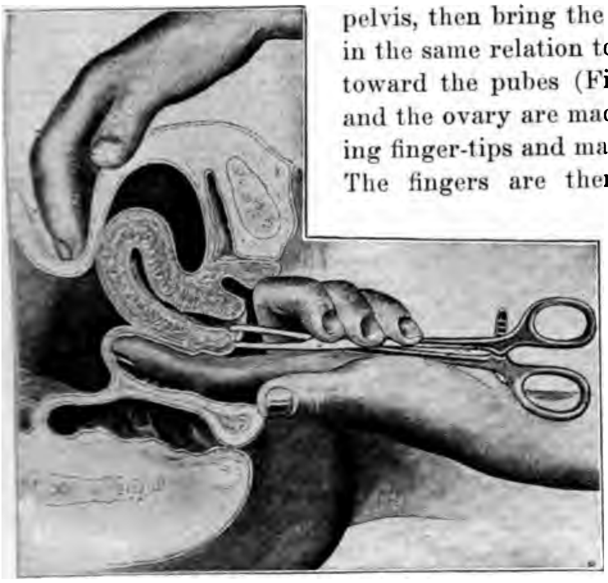


Fig. 74. Drawing the uterus down with a tenaculum-forceps to bring it within reach of the examining fingers. (Dudley—*Practice of Gynecology*.)

In these manipulations the palpation proper is made principally with the vaginal fingers, the abdominal fingers serving simply to push the structures down within reach of the fingers below.

A common error is to bring the tips of the examining fingers together too close to the pubes; hence the palpation is of the tissue in front of the tube and ovary, even if they are in normal position. It must be kept in mind also that the tube and ovary are likely to be displaced, especially if diseased, and the displacement is nearly always backward; hence the importance of getting far back in the side of the pelvis when endeavoring to accurately palpate these structures.

In order to avoid this error, be certain that the point of depression of the abdominal wall is well above the tubo-ovarian region, so that when depressed into the pelvis it will lie back of the tube and ovary.

In palpating the right side of the pelvis follow the same directions, substituting "right" for "left" (Fig. 83).

Facts to Determine.

In the exploration in the tubo-ovarian region take particular care to search for:

Tube and Ovary—usually not felt if normal;
Abnormal Mass—enlarged tube or ovary, exudate, tumor;
Induration—Inflammatory infiltration or exudate, adhesions, scar-tissue;
Tender Area—normal sensitiveness of ovaries, inflammation, hyperesthesia, tenderness from other cause.

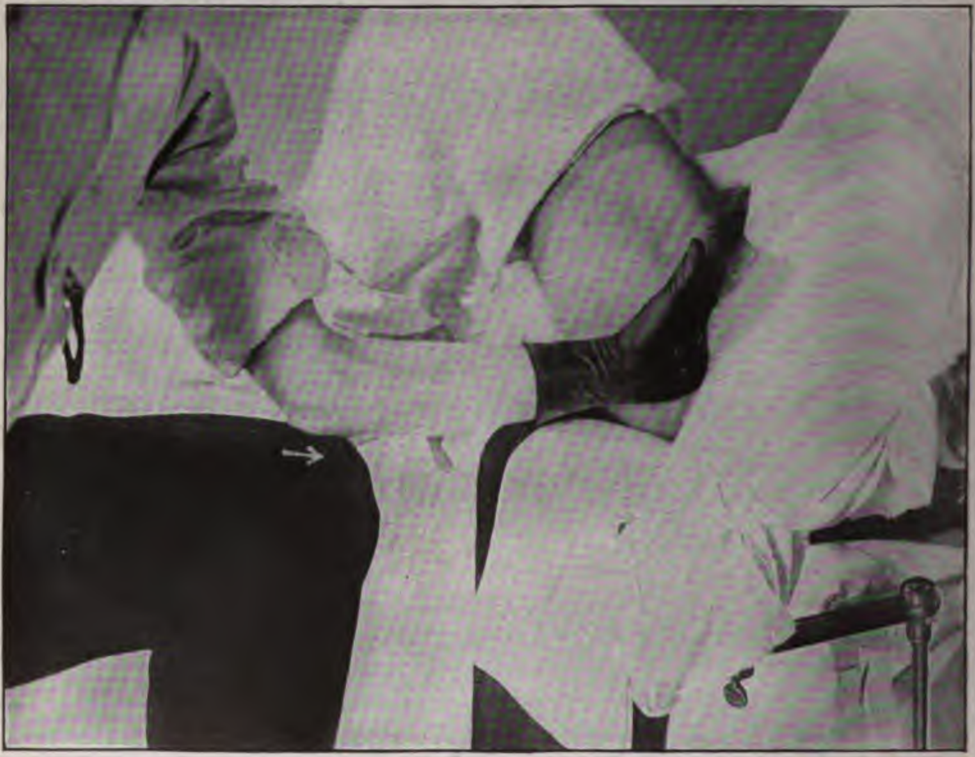


Fig. 75. Invagination of the perineum and pelvic floor, the force being transmitted through the knee.

Tube and Ovary. In many cases the normal tube and ovary cannot be distinctly felt, even by the experienced examiner, and the inexperienced will find it difficult even in comparatively easy cases. When the tube or ovary is decidedly enlarged, it can be felt to slip between the examining fingers as a distinct thickening or as a small rounded mass.

After locating the adnexa, as above described, it is sometimes advantageous to try to trace the tube out from the uterus. The fundus uteri is located, the examining fingers (vaginal and abdominal making united counter-pressure) pass to the upper outer angle, and then feel for the tube as it leaves the uterus and runs along the top of the broad ligament. The best place to locate it usually, when not abnormally indurated, is just beyond the angle of the uterus. It is a much firmer cord here than farther out, where the cavity becomes large and the tube soft.

The normal Fallopian tube may be felt in a suitable case (thin patient with relaxed abdominal wall and relaxed pelvic floor), in the position indicated, as a small soft cord about the size of a slate-pencil. It presents very much the consistency of a piece of rubber tubing. It may, in a suitable case, be traced outward and is then lost in a region of the ampulla, where the tube becomes very soft and the ovary comes into prominence as a soft rounded movable body, a trifle larger than the end of the thumb and sensitive to pressure. When the tube is inflamed it becomes harder and larger, and is more easily felt. It then feels very much like a rather firm piece of rubber tubing of about the size of a lead-pencil or larger, extending outward from the angle of the uterus, with irregular curves and bendings and enlargements. From this

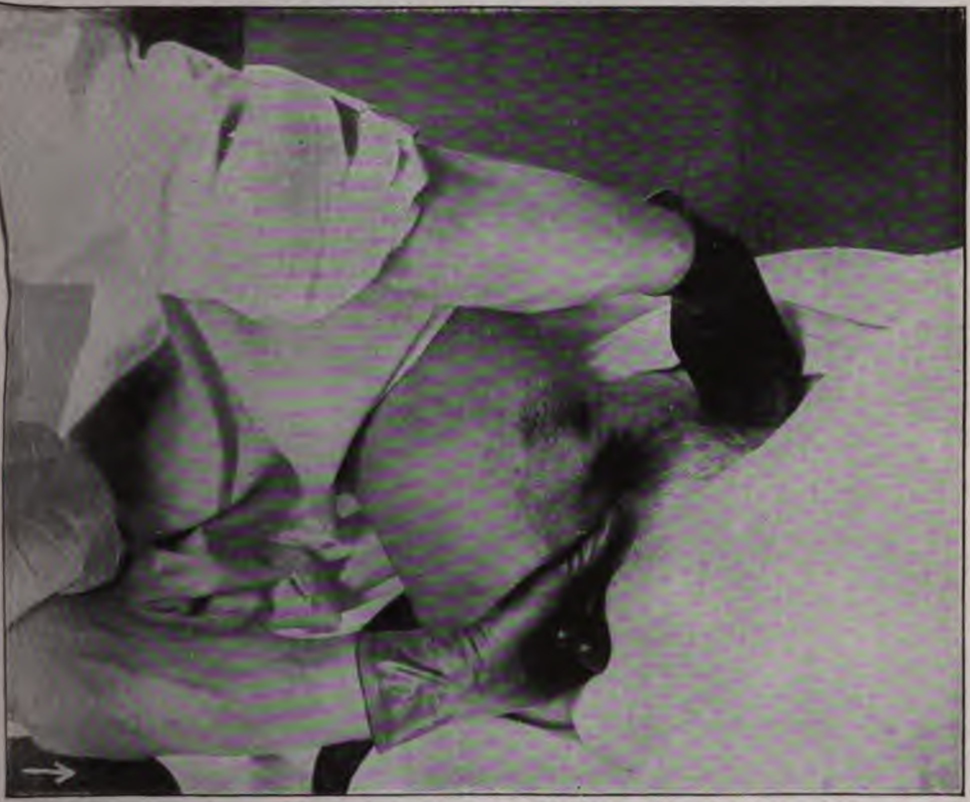


Fig. 76. Use of this maneuver for invaginating the pelvic floor in the deep bimanual palpation.

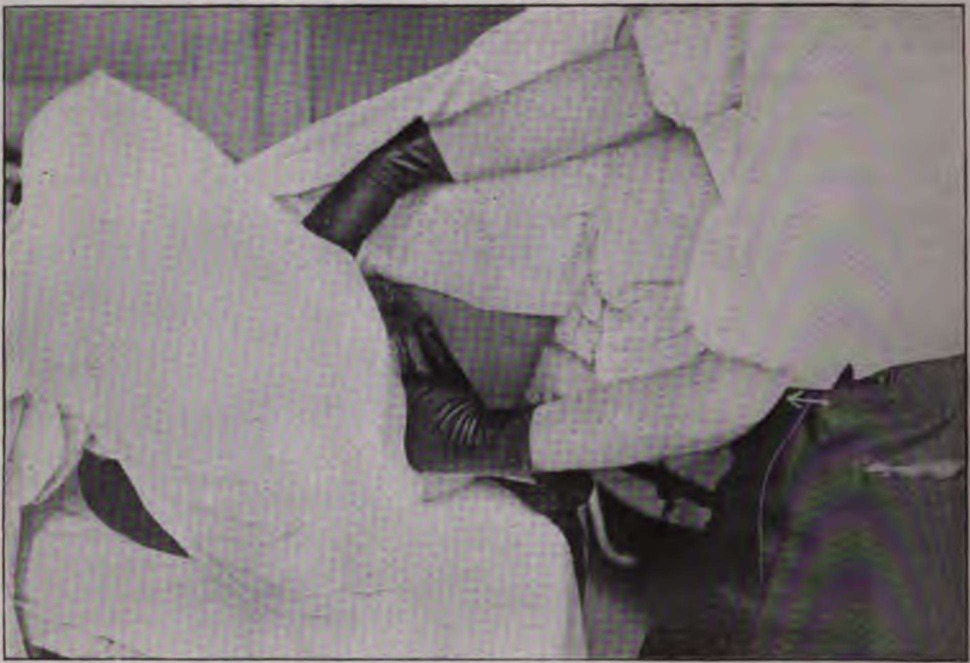


Fig. 77. Transmitting the force to the elbow through the iliac crest in deep bimanual palpation.

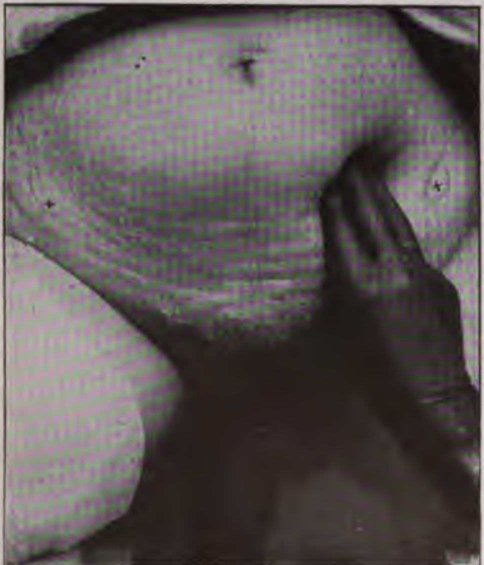


Fig. 78. Palpation of the left lateral region. Placing the fingers of the abdominal hand. They should be on a level with, or a little above, the anterior superior spine (indicated by the cross.)

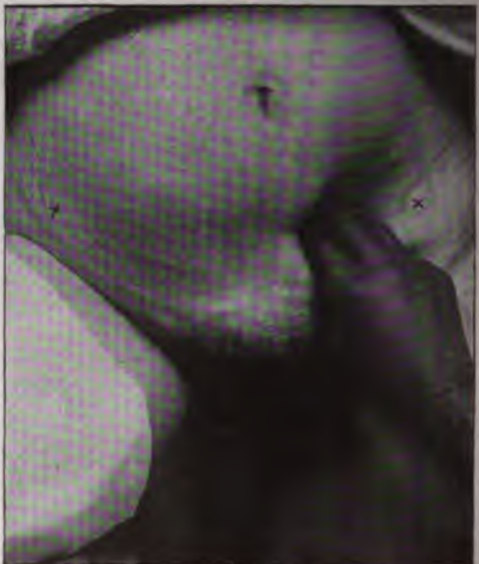


Fig. 79. Palpation of the left lateral region. Depressing the abdominal wall deeply into the pelvis.

size it may enlarge to a mass that fills all that side of the pelvis. Usually, however, when the inflammation is at all severe, adhesions or plastic exudate surround the tube and ovary, binding them and the surrounding structures together in one mass and making their separate differentiation impossible.

If on examination the pelvic tissues are all soft and yielding, and no particular pain is caused by the palpation, you may be certain that the tubes and ovaries are not seriously diseased, though you may not have felt them.

Mass in Lateral Part of Pelvis. The pelvic tissues, with the exception of the uterus, are soft and yielding, and any firm body may be felt through them, either a tumor or an inflammatory exudate or a firm blood-clot. Fluid blood or serous exudate cannot be felt unless it is incapsulated. If a mass is found to either side of the uterus, determine concerning this mass the same facts that you did concerning the uterus—namely, its position, size, shape, consistency, tenderness, mobility and attachments. Determine particularly whether or not it is attached to the uterus, and, if so, whether by a broad attachment or by a narrow one.

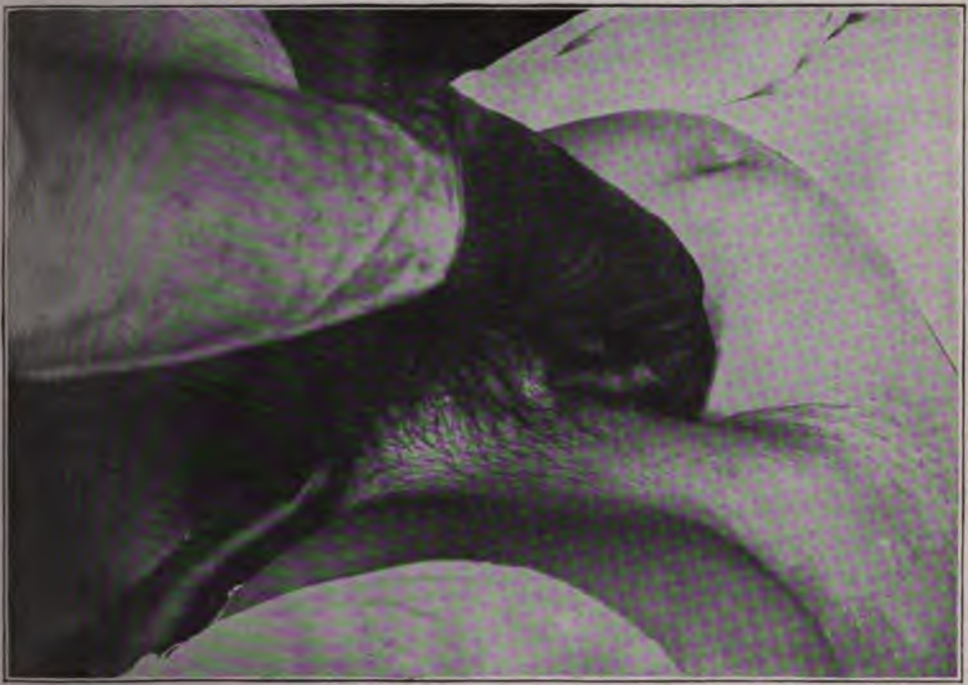


Fig. 80 A view from another direction, showing the marked depression of the abdominal wall in deep pelvic palpation

Induration in the Lateral Part of Pelvis. In some cases where there is no di ct mass felt, there is a very definite hardening of tissues at some point. the tissues being soft and pliable, and easily pushed before the exger, as they are normally, there is a stiffness and fixation and resistance, as though there were infiltration and thickening, and the structures beyond cannot be satisfactorily palpated. This resistance and fixation of tissue without a well-defined mass is designated by the term "induration." It may be due to infiltration (inflammatory, tubercular, malignant) of the tissues, to inflammatory exudate on surfaces, to adhesions, to scar-tissue or to a tumor not yet developed far enough to form a distinct mass.

Tender Area in Lateral Part of Pelvis. The ovaries are usually rather sensitive on bimanual palpation, and allowance must be made for this normal sensitiveness when estimating the diagnostic significance of tenderness in this region.

Tenderness on palpation may accompany almost any pathological condition in the pelvis, but it is especially marked in inflammatory trouble, in peritoneal irritation from blood in the peritoneal cavity and in neuralgic affections of the pelvis.

PALPATION OF OTHER REGIONS.

In the same way as already described, careful exploration is made of:

Posterior Part of Pelvic Cavity—tenderness, induration, mass;
Anterior Part of Pelvic Cavity—tenderness, induration, mass;
Ureteral Regions—tenderness, induration, mass;
Pelvic Nerve Trunks—tenderness;
Lower Abdomen—tenderness, tension, induration, mass.

If a mass is found, determine as accurately as possible its position, size, shape, consistency, tenderness, mobility and attachments.

The method of determining whether a mass is attached to the uterus, and, if so, how intimately, is shown in Figs. 84 and 85, where the sulcus between the uterus and the mass is being palpated to determine its depth. In the case of a tumor with a long pedicle it is well to have an assistant hold the tumor up in the abdomen out of the way, while the examiner, by bimanual palpation, feels whether or not there is any connection with the uterus or appendages. Also, the uterus may be caught with a tenaculum forceps and pulled downward (Fig. 103), assisting still further in palpation. Another point is that in the case of a broad attachment to the uterus the mass and uterus move as one body, whereas with a long attachment the two may be moved separately.

In palpating the interior part of the pelvis, if the body of the uterus is not felt in front and still the vaginal and abdominal fingers cannot be brought well together, have the patient pass the urine, and then examine again. If the patient cannot urinate, or does not seem to empty the bladder well, she may be catheterized. A spontaneous urination in the upright posture empties the bladder better, and is safer than catheterization, which may be followed by cystitis. A partly filled bladder is not felt as a distinct mass, and yet there may be half a pint or more of urine—enough to make the palpation very unsatisfactory. The peculi about this condition is that here is nothing to indicate it, except the difficulty in locating the body of the uterus in deep palpation. No mass is felt and the tissues are all soft and yielding and there is no particular pain. The fingers seem to sink into the pelvic tissues well, but for some unaccountable reason the uterus is difficult to feel. It seems too far back in the pelvis and yet when you try to bring the fingers together in front of it, they do not come together well. When such a condition is encountered in an apparently normal abdomen (no marked obesity or muscular tension) it is probably due to a collection of urine in the bladder or to intestinal coils in the pelvis. If it does not disappear after the bladder is evacuated, then elevate the patient's hips, to get the tympanitic intestinal coils out of the pelvis. The bladder and other tissues in front of the uterus should be palpated (Fig. 66) to determine if there is any mass or any marked tenderness.

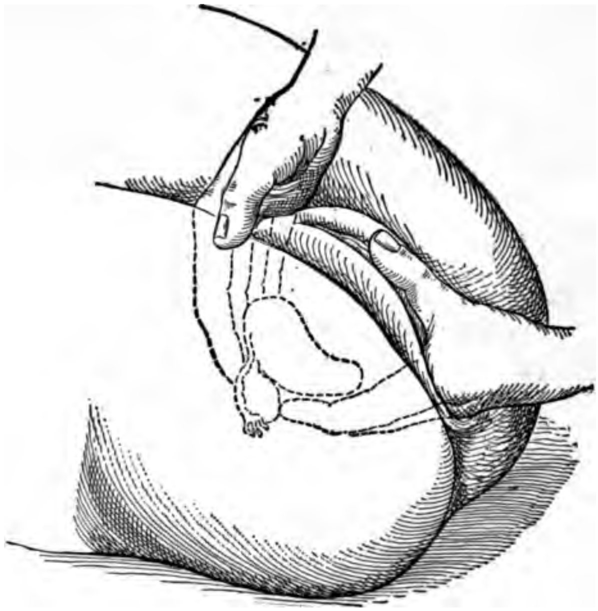


Fig. 81. The ovary caught between the examining fingers. (Ashton — *Practice of Gynecology.*)

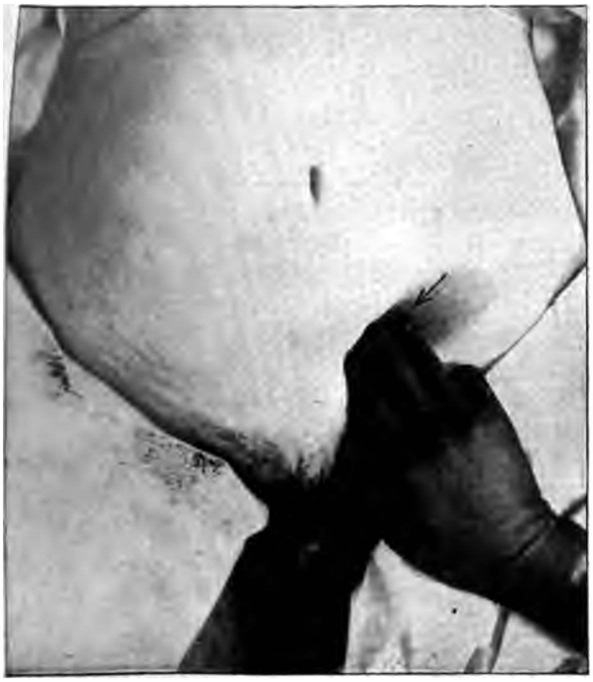


Fig. 82. The abdominal fingers moving downward.

The region of the ureter on either side is an interesting area which is usually overlooked in pelvic palpation. The ureter extends on each side from the base of the bladder backward, outward and upward, about half an inch from the cervix uteri. Ordinarily it is not felt. In a suitable case, however, it may be felt as a rather indefinite cord or line of tension, extending from the base of the bladder in the direction indicated. Fig. 86 indicates the method of palpating this region. If inflamed, the ureter is tender on pressure. If infiltrated and thickened, it is easily felt. If a stone is lodged in the lower portion of the ureter, it may be felt. In this way I was able to determine definitely that a stone was lodged in the left ureter, a short distance from the bladder, in the case of a pregnant woman with such sudden severe pain and threatening symptoms that it was at first feared that the trouble was rupture of an extrauterine pregnancy. The patient eventually recovered and carried the child to term.

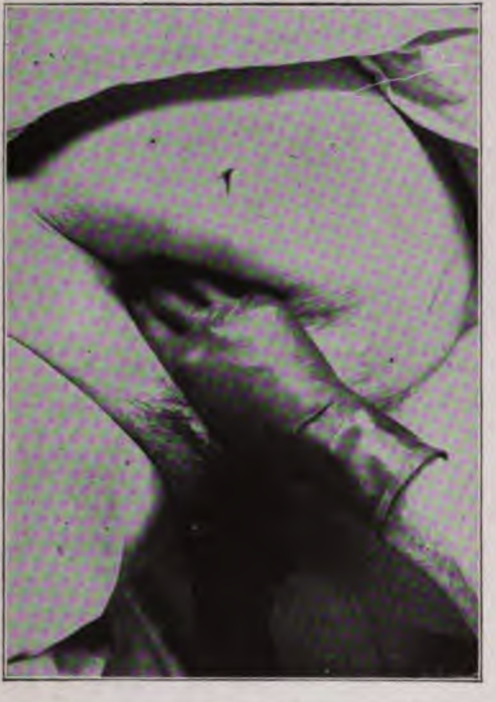


Fig. 83. Palpating right tubo-ovarian region.

If much inflammation has taken place about a stone or an infected portion of the ureter, there may be considerable peri-ureteral infiltration that in a measure obscures the ureter, and gives the signs simply of a cellulitis at that side of the uterus and extending toward the bladder. A cellulitis associated with persistent bladder symptoms should be carefully investigated, with the idea that it may come from the ureter. Determine if the induration runs into the region of the ureter and if there is tenderness farther up along the ureter or in the kidney, or if the urine gives evidence of disease in the urinary tract. In a considerable proportion of the cases presenting persistent bladder irritability and classed as chronic cystitis, the trouble is really located in the ureter. Inflammation or tuberculosis of the lower part of the ureter, gives symptoms very closely resembling chronic cystitis.

In cases where pelvic neuralgia or neuritis is suspected, palpate the pelvic nerve trunks (Figs. 87 and 88). Sometimes the pelvic tenderness, which at first seems widespread, may be localized in its greatest intensity along the nerve trunks of one or both sides. These may be reached by deep palpation per vaginam or per rectum.

GENERAL OBSERVATIONS ON BIMANUAL EXAMINATION.

It may seem hardly worth while to take the trouble to make out all these little points in regard to the uterus or a mass beside the uterus, **but it is worth while,** and the farther one advances in diagnosis the more he appreciates this fact. The ability to make a correct diagnosis in deep seated pelvic disease depends largely on the ability to answer the above questions correctly, and until one can determine facts

as above indicated, in regard to the uterus or other pelvic mass, his diagnosis is simply a guess and not a diagnosis at all.

Importance of the Educated Touch.

I want to emphasize the importance of **training the hands**—of acquiring the "tactus eruditis." The following quotation from an article of mine on the subject brings out this point. "The multiplication of instruments for diagnostic purposes has, to some extent, obscured the importance of the educated touch. The beginner in gynecological work is bewildered by the great variety of specula, tenacula and other instruments for diagnosis, and he is accordingly impressed with the idea that the principal thing is to learn how to use instruments, and then to use them on every occasion. One of the first duties of a teacher in gynecology is to displace this erroneous idea by showing the importance of the use of the hands. Most of the serious diseases of women affect structures that lie beyond the reach of sight. To the teacher falls the duty of directing the student's efforts in such a way that he will acquire the ability to distinguish these intrapelvic conditions in the only way that such conditions can be distinguished, namely, by touch. After the student has, by lectures, supplemented by charts and demonstrations, been helped to form a mental picture of the normal organs—their position, size, shape, structure and relations—then comes the task of helping him to recognize such conditions by the sense of touch. This is not a matter of a few days. It takes weeks and months of patient work and many careful examinations, to be able to recognize normal conditions. The abdominal wall and the vaginal wall intervene between the examining fingers and the important organs. These intervening structures vary so much in thickness, in consistency, in tension and in sensitiveness, that there is infinite variety in the facility with which the organs may be outlined. Again, the organs themselves vary much within normal limits, in different individuals and in the same individual at different times.

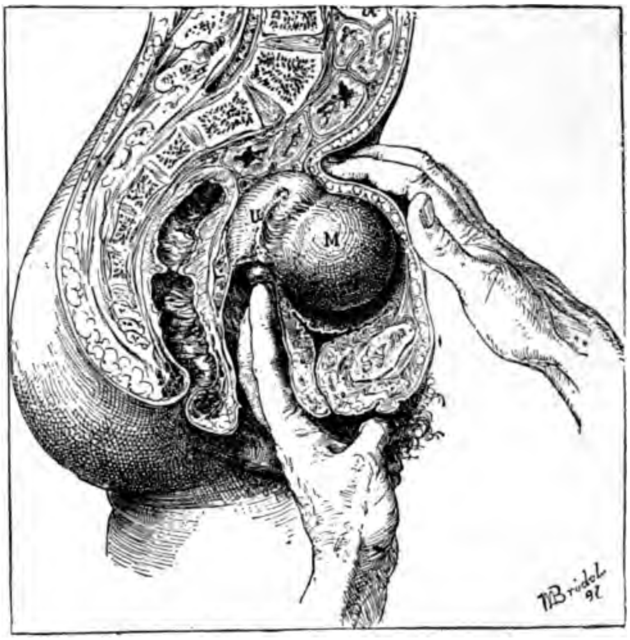


Fig. 84. Method of determining how intimately a mass is attached to the uterus. Palpating the sulcus between the two. (Kelly—*Operative Gynecology*.)

"The beginner must learn to read the conditions first by learning the separate letters, so to speak, and then learning what certain groupings of letters mean. The separate items that must be recognized in this examination are the position, size, shape, consistency, tenderness, mobility and attachments of the organs. This takes much time and patience and well directed efforts through many examinations. It cannot be learned from lectures. It cannot be learned by seeing someone make examinations and applications. It can be learned only through repeated bimanual examinations by the student himself, under competent instruction. Hence the importance of the clinical portion of a gynecological course.

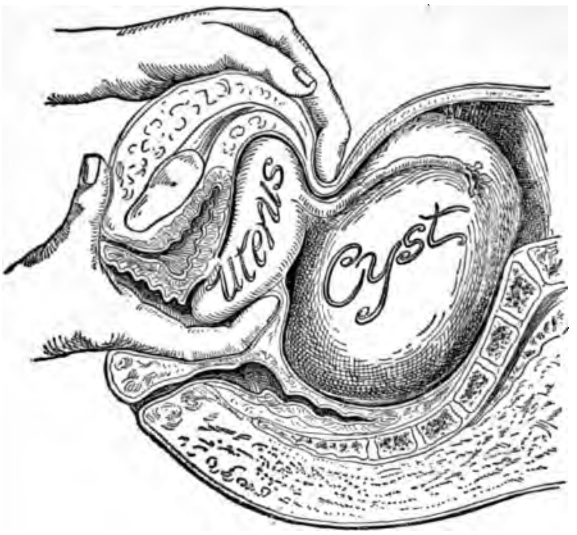


Fig. 85. Determining what attachment there is between the uterus and a cyst back of it. The uterus is caught between the hands and brought forward and the examining fingers are crowded in between the uterus and the mass (Ashton—*Practice of Gynecology*.)

"Though it takes considerable time to learn to recognize normal conditions, the time is well spent. for no real progress is possible without this knowledge. The normal must be known before the abnormal can be appreciated. This is self-evident and yet how many students at graduation, and physicians long after graduation, find it difficult to feel more than the vaginal walls and cervix.

"In the recognition of pathological conditions, the same points must be considered (position, size, shape, consistency, tenderness, mobility and attachments), and this information, supplemented by the history, determines the diagnosis. This determination of the particular pathological conditions present is accomplished almost altogether by the hands, either in the ordinary bimanual examination or in the examination under anesthesia.

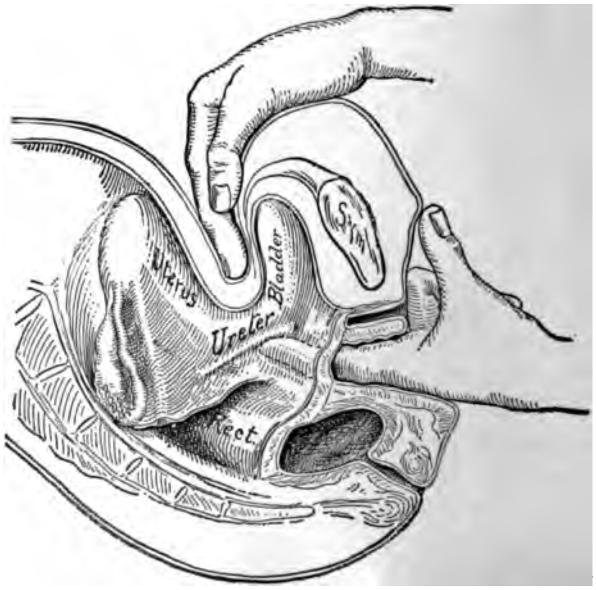


Fig. 86. Palpating the region of the right ureter. (Ashton—*Practice of Gynecology*.)

"I do not wish to minimize

the value of diagnostic instruments (specula, sounds, curets, etc). They are often helpful and in some cases indispensable to a positive diagnosis, and their use should not be neglected. But I want to emphasize the fact that in gynecological examinations generally, instruments are of secondary importance and only supplemental to the trained hand."

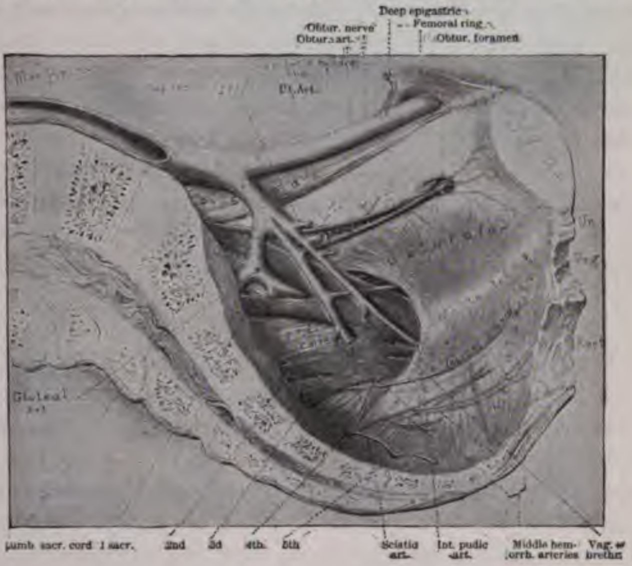


Fig. 87. Showing the exact situation of the large nerve roots in the pelvis. In the illustration the large nerve roots appear a shade darker in color than the other structures. (Kelly—*Operative Gynecology.*)

Take every opportunity to educate the fingers to appreciate as accurately as possible the various conditions found in the pelvis. When examining a suitable case, outline the uterus and all the pelvic structures as clearly as you can, even if not necessary to the diagnosis in that particular case. Each careful examination made serves to educate the fingers, or rather serves to educate the mind to appreciate what is between the fingers, and prepares you to make out the exact conditions in difficult cases.

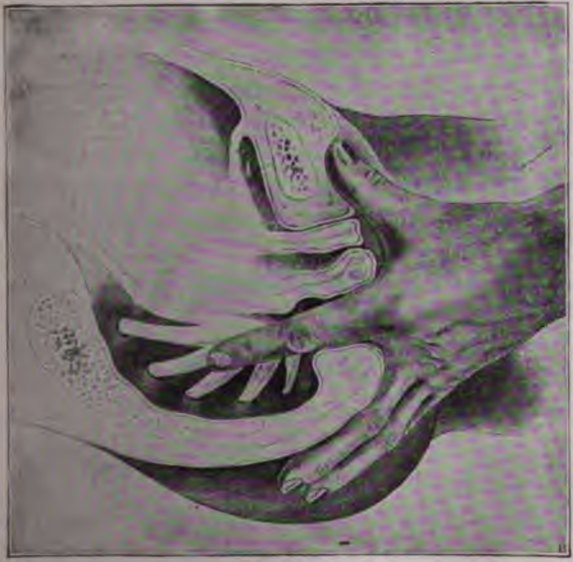


Fig. 88. Palpating the pelvic nerve trunks per rectum. (Dudley—*Practice of Gynecology.*)

Train one Hand.

In the bimanual examination, it is well to train one hand for the vaginal manipulations. For this purpose, either the right or the left hand may be selected, as the examiner finds more convenient. I use the left, leaving the right free for the abdominal palpation and for the handling of instruments. The advantage of using the same hand in vaginal manipulations in practically all cases, is that the **power of discrimination** by the fingers of that hand increases as more and more examinations are made. At the same time, the abdominal hand becomes accustomed to the abdominal manipulations and as the examining hands are in practically the same relation in every case, deviations from the normal are more readily recognized and more accurately defined than if the two hands were used indiscriminately and hence in different relations. This is especially true when the examiner has the advantage of only a limited number of examinations.

In exceptional cases, it is an advantage to use first one hand and then the other for vaginal palpation. In some cases, the right side of the pelvis can be explored better with the fingers of the right hand and the left side with the fingers of the left hand.

Use Two Fingers.

Use two fingers in the vagina when the vaginal opening is large enough to permit their use without pain. A **deeper and more accurate** examination can be made with two fingers (index and middle finger) than with the index finger alone. The upper part of the vagina is capacious. The only difficulty is at the vaginal entrance. By lubricating the fingers well, and depressing the perineum and working carefully, the two fingers may be used without discomfort in practically all parous women, and in most non-parous women who have been married.

Examine Deeply in Pelvis.

In many cases, in order to palpate the posterior part of the pelvis and particularly to satisfactorily palpate the tubo-ovarian regions, the vaginal fingers must reach farther than their length will permit. The extra reach is secured by **carrying the perineum into the pelvis** (invagination of the pelvic floor) by strong steady pressure inward. The soft structures closing the pelvic outlet can be carried for a considerable distance inward without particular discomfort to the patient, provided all the muscles are relaxed. In parous women, from one to two inches may usually be thus added to the effective length of the examining fingers.

The force required, while not great, is likely, if exerted by the arm muscles alone, to interfere with delicate palpation by the examining fingers. It adds much to the effectiveness of the examination to exert this pressure by the body muscles, leaving the arm muscles free for the internal palpation movements. This may be accomplished either by placing the left foot (when examining with the left hand) on a stool or chair-round and resting the elbow on the knee (Figs. 75, 76), or by letting the elbow rest against the hip (Fig. 77).

May Draw the Uterus Down.

It is advantageous in the bimanual examination in some cases, to catch the cervix with the tenaculum forceps and draw the uterus downward, so that the examining fingers may reach higher on its posterior surface (Fig. 74). This is useful in those cases where the uterus lies so far back in the pelvis that it is difficult to reach. After making the vagino-abdominal examination in the usual way, the tenaculum may then be introduced by touch and the cervix caught and brought down.

Only light traction should be made—not enough to unduly stretch the sacro-uterine ligaments, which might lead to subsequent trouble. I want to protest against the statement made by some authorities to the effect that the normal uterus may with impunity be pulled down until the cervix appears at the vaginal opening, or may without harm be turned into extreme retroversion, for the purpose of palpating the posterior surface or even hooking a finger in the rectum over the fundus and palpating the anterior surface. The uterus is usually movable in all directions, but the movements here mentioned are far beyond the normal range and can be accomplished only by undue stretching of the structures intended to prevent such displacements.

Of course, when the pelvic structures are already overstretched and lax, as in cases of laceration of the pelvic floor with descent of the uterus or in cases of movable retrodisplacement, these extreme maneuvers may be carried out without further damage, and, in doubtful cases, with great advantage in regard to accuracy of diagnosis. In a patient with practically normal uterine supports, however, the pulling down of the uterus or the backward displacement of the uterus for diagnostic purposes or for therapeutic purposes (as in curetment or repair of cervix), **should be of very limited extent.** It is easy to overstretch the uterine supports but it is not so easy to restore tone to these structures so that they will again hold the uterus in just the right way. This is particularly important in regard to the postcervical supports (sacro-uterine ligaments and adjacent tissues) which are stretched every time the cervix is pulled downward. When these are once over-stretched and rendered lax, it is practically impossible to keep the uterus permanently in proper position except by operation.

Preferable Position for Examiner.

For the vaginal and bimanual examinations, it is decidedly advantageous for the examiner to stand directly **in front** of the vaginal opening, as shown in Fig. 75. This is especially important when very deep pelvic palpation is necessary. This is the usual position when the patient is examined on the table with foot-rests so that the hips may be brought entirely to the end of the table.

When a patient is examined in bed, however, the usual directions are to pass the examining arm under one thigh. This puts the examining arm and hand at a decided disadvantage. The examiner should sit so that the examining arm passes **between the thighs** as shown in Fig. 114. This puts the arm directly in front of the genitals, the same as in the examination on the table. This brings the arm and hand in the most advantageous position for accurate palpation deep in the pelvis, as the reader can easily demonstrate to his own satisfaction by giving a trial of each method in some difficult case requiring deep palpation.

Conditions in Different Patients.

The facility with which the bimanual examination can be made varies much in different patients. In some, the fingers on entering the vagina are checked by the strong contraction of the muscles of the pelvic floor. When such is the case, turn the palmar surface of the examining fingers backward and make steady pressure against the posterior vaginal wall and the contracting muscles. This gives you an idea of the strength of the muscles of the pelvic floor and soon, under the pressure, the muscles relax. Another troublesome obstacle to deep bimanual examination is tension of the abdominal wall. The methods of overcoming this have already been explained.

In a thin patient, with a large vagina and a relaxed abdominal wall, the uterus can be outlined and the appendages felt, and any abnormal mass, even a small one, can be satisfactorily palpated.

In a stout patient, with a thick layer of fat over the abdomen, the ordinary bimanual examination is often unsatisfactory, particularly if there is inflammatory trouble with tension of the abdominal wall. In such a case, a mass of considerable size, if situated high in the pelvis, may be missed entirely. The only way to determine exactly the pelvic contents in such a case is to make an examination under anesthesia. Such an examination should be made in those cases where the symptoms are urgent enough to make an immediate accurate diagnosis necessary.

Get Intestines Out of the Way.

In some cases, particularly when there is considerable tympanites, distended coils of intestine interfere with the bimanual palpation of the pelvic structures.

To overcome this difficulty, **elevate the patient's hips** into the Trendelenburg posture. Then work the intestines out of the pelvis and hold them out as the hips are slowly lowered into a more comfortable position. Leave the hips rather high, as high as the patient will stand without discomfort, and direct her to keep all the muscles loose and breathe quietly, so as not to force the intestinal coils back into the pelvis. The regular bimanual palpation may then be carried out, undisturbed by the troublesome intestinal coils.

This is a very convenient maneuver also for getting a pediculated tumor out of the pelvis, that its pedicle and point of origin may be accurately determined by bimanual palpation.

In case the table is not arranged for the convenient elevation of the hips, the hips may be elevated by means of pillows or the patient may be placed in the **knee-chest posture** for a few moments. With the clothing well loosened and the correct knee-chest posture assumed, the distended intestinal coils fall out of the pelvis better than in the Trendelenburg posture, but in the exertion of assuming the dorsal posture again they are likely to be partially forced back. Avoid this as much as possible by directing the patient to keep the upper part of the body on the table (not to raise it, as in partly sitting up) and to keep the abdominal muscles loose. Also place a thick pillow under the hips, as the dorsal posture is assumed. An additional expedient is to put a speculum in the vagina and in the rectum while the patient is in the knee-chest posture. The vagina and rectum then balloon with air, forcing the intestinal coils out of the pelvis. The specula are then removed and the openings close, retaining the air which helps to keep the intestinal coils out of the pelvis in the subsequent movements.

Diminish Tenderness.

In many patients satisfactory pelvic exploration is prevented by tenderness, particularly in that large class of cases in which pelvic inflammation is a primary or complicating lesion. In some of these cases the symptoms are so urgent that an examination under anesthesia at once is advisable. In most of the cases, however, the symptoms are not so threatening as to necessitate immediate examination under anesthesia. The patient has come for a diagnosis but an accurate diagnosis can not be made because of the tenderness which prevents deep palpation. What shall the examiner do under these circumstances? There are two measures which are useful in diminishing the tenderness and abdominal tension.

1. Administration of a sedative. The patient may be given ½ gr. of codeine phosphate hypodermatically, or ⅙ gr. or ¼ gr. of morphia, and examined again after half an hour.

If thought preferable, an appointment may be made for the next day and an order given for the sedative to be taken by mouth one hour before your visit. In the meantime the patient is kept quiet in bed and the bowels well opened. It is well to have an enema given half an hour before examination.

2. Treatment for the inflammation. The patient is kept in bed, the bowels well opened, hot vaginal douches given and the regular treatment for acute or subacute pelvic inflammation carried out This treatment continued for a few days or a week will do much toward diminishing the tenderness, so that a thorough pelvic examination may be made.

RECTO-ABDOMINAL PALPATION.

In many cases it is of decided advantage to follow the vagino-abdominal examination by a recto-abdominal examination. In this form of bimanual examination, the index-finger, gloved and lubricated, is introduced into the rectum and passed upward between the sacro-uterine ligaments as far as possible up the posterior surface of the uterus. With the fingers of the other hand pressing down the organs from above, all the structures within reach are palpated with the palmar surface of the rectal finger (Fig. 102).

Disadvantages.

Ordinarily, palpation of the pelvic structures may be carried out much more thoroughly by vagino-abdominal examination than by recto-abdominal examination. Without anesthesia but one finger can be used in the rectum and this finger lies at a considerable distance from the uterus and adnexa, unless carried very high. It cannot usually be carried very high on account of the encircling sphincter and pelvic floor, except by the use of such force as to cause pain and resistance. In some cases where the pelvic floor is lax, the examining hand may easily carry the peri-anal structures some distance into the pelvis, thus allowing the examining finger to pass high up back of the uterus and permitting accurate bimanual palpation of the adnexa. The facility with which the organs may be felt is increased by catching the cervix with a tenaculum forceps and bringing the uterus somewhat lower. In all but exceptional cases, however, accurate examination of the pelvic contents by recto-abdominal palpation is practicable only under anesthesia. However, such palpation as can be carried out without anesthesia gives information of value in some cases, as indicated in the following paragraphs.

When Useful.

It is well to employ digital examination per rectum, or conjoined (bimanual) recto-abdominal palpation, in the following cases:

Mass in Cul-de-sac. Rectal palpation is useful when there is a mass of inflammatory exudate or a tumor low in the peritoneal cul-de-sac back of the uterus. In the case of an inflammatory mass in that situation, fluctuation may be in some cases detected while it is not yet appreciable by vaginal examination.

Malignant Infiltration. In malignant disease of the cervix extending out into the parametrium, rectal palpation will in some cases give additional information as to the extent of the infiltration and the mobility or fixation of the uterus.

Rectal Disease. When a patient gives symptoms pointing to rectal disease, the rectum should of course be examined by palpation and also by inspection through rectal speculum if necessary to determine the exact condition.

Obscure Cases. In cases where the other methods do not show lesions sufficient to account for the symptoms, a rectal examination should be made to determine if there is any rectal or perirectal disease that might account for the pelvic pain and distress.

Occasionally in a Virgin. The information concerning the uterus and adnexa thus obtained is usually very indefinite, as explained below. In such examination the landmark is the cervix uteri, which may be easily felt through the rectal wall. Notice if there is a distinct mass back of the cervix (inflammatory mass, tumor, fundus uteri in retrodisplacement) or a point of special tenderness anywhere in the lower part of the pelvis.

BIMANUAL EXAMINATION OF A VIRGIN.

As previously explained, local examination in the case of a virgin is to be avoided if possible. When it is necessary to make an intrapelvic examination, what method should be used?

The direction has been given, in various works, to examine virgins by the rectum when it is necessary to determine the condition of the uterus or adnexa, in order to avoid stretching the hymen. In a virgin those conditions which militate against a satisfactory palpation of the uterus and adnexa by recto-abdominal examination, are at their height. Usually after such an examination without anesthesia the examiner knows but little more concerning the uterus and adnexa than he did before the examination. Of course if there is a good sized mass low in the pelvis or a particularly tender area, its presence is determined. But the information is usually too indefinite for an exact diagnosis. Such an examination does very well however, to "break the ice" so to speak, and it may be explained then that the conditions are such that a vaginal examination is advisable. In some cases the recto-abdominal examination is very satisfactory, the required information being obtained with fair accuracy.

In the rectal palpation, the cervix uteri can be felt through the rectal wall. If there is no mass back of the cervix (inflammatory mass or tumor or fundus uteri deep in cul-de-sac) and no area of particular tenderness in the pelvis, it may be advisable to postpone further local examination and try general therapeutic measures for several weeks or months.

Usually, however, when the symptoms are severe enough to warrant any local examination, they are severe enough to warrant a recto-abdominal examination under anesthesia, or a stretching of the hymen sufficiently to admit one finger, so that the regular vaginal and vaginal-abdominal examination may be made. The condition of the uterus and the adnexa may be much more definitely determined in this way than by rectal palpation.

In a large proportion of virgins, even the regular vagino-abdominal palpation does not permit accurate outlining of the uterus or of adnexal masses. Consequently, in the case of a virgin where there is serious pelvic trouble necessitating an accurate palpation of the pelvic contents, an examination under anesthesia is usually required. In cases where the necessity of a thorough pelvic examination is apparent from the first, it is preferable, in a girl or a young unmarried woman, to at once examine the patient under an anesthetic. This eliminates the mental shock of the procedure and at the same time permits a thorough exploration. It is well to employ recto-abdominal palpation first and then, if necessary, vagino-abdominal palpation. In addition, any operative measure required for diagnostic or therapeutic purposes, may be carried out, for example, dilatation and curetment of uterus or removal of hemorrhoids.

RECTO-VAGINO-ABDOMINAL PALPATION.

In exceptional cases when making the recto-abdominal examination, it is advantageous to introduce the thumb into the vagina in order to grasp the lower part of a mass between the finger in the rectum and the thumb in the upper part of the vaginal canal, the structure being pushed down within reach by the abdominal hand (recto-vagino-abdominal palpation). Where a mass is low enough to be grasped in this way, its outline and consistency can be very accurately determined. It is only in the cases of large vaginal opening and relaxed floor that this method is applicable, and to be of much service anesthesia is usually required. Occasionally, however, it is useful in the ordinary examination.

I recall in particular one puzzling case, that was referred to me for differential diagnosis, in which this maneuver was of much assistance. The patient presented a mass of moderate size, pretty well filling the pelvis. The mass contained fluid, the cervix was somewhat softened and the uterine body could not be definitely located. The differentiation was between an enlarged uterus containing fluid (normal or abnormal pregnancy) and some other fluid mass (cystic fibroid, extrauterine pregnancy, hydrosalpinx, ovarian or parovarian cyst). The history was uncertain and the findings in the ordinary examination were not positive. The crucial point was to identify the body of the uterus. Was this large mass the body of the uterus enlarged (pregnancy) or was the body of the uterus of practically normal size and located somewhere in the mass?

Sounding of the uterine canal was not permissible until pregnancy could be excluded. The lower posterior part of the large mass presented a small firm portion, which might be the normal-sized body of the uterus displaced or simply a firm portion of an enlarged uterus. The firm area was so covered over and surrounded by the mass that I could not make satisfactory bimanual palation of it, neither could I definitely outline it through a sufficient extent by either vaginal or rectal palpation. Finally I tried to grasp this firm portion of the mass between the finger in the rectum and the thumb in the vagina. As the vaginal opening and pelvic floor were lax, I could carry the thumb to the top of the vagina without much discomfort to the patient, and by crowding the mass down with the abdominal hand, I was able to grasp the firm portion between the finger and the thumb of the left hand and separate it from the fluid mass sufficiently to trace its outline and get the consistency throughout. It was of about the size, shape and consistency of the normal uterus, and by working the finger and thumb toward each other above this firm part, I could demonstrate that the fluid portion of the mass had a separate wall. I now felt safe in introducing the sound, which confirmed the palpation findings. This firm area was the displaced body of the uterus, otherwise practically normal, and the surrounding fluid mass was a separate affair, an ovarian or parovarian cyst.

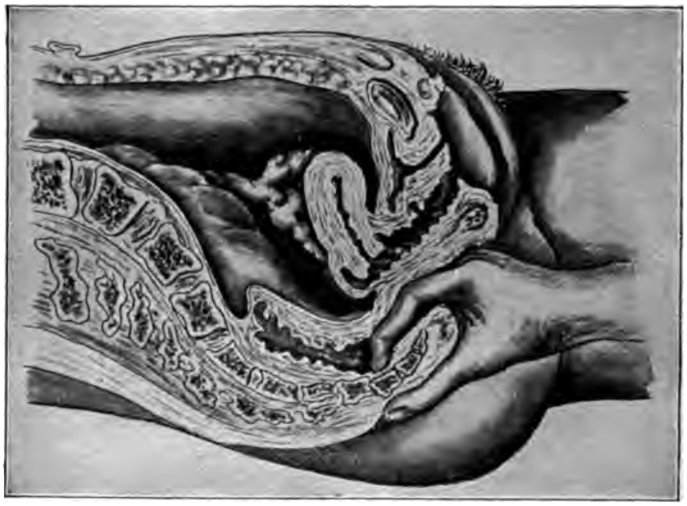


Fig. 89. Method of palpating the coccyx. The hand should be gloved. (Hirst — *Diseases of Women*.)

A modification of this method is to introduce the middle finger into the rectum and the index finger into the vagina and palpate the structures between the fingers, as the uterus is pushed down from above. This particular method of recto-vagino-abdominal palpation has been found useful in determining the extent of involvment of the parametrium in cases of carcinoma of the cervix uteri.

PALPATION OF COCCYX.

In cases of persistent pelvic pain where no sufficient cause is found about the uterus or adnexa, the coccyx should be palpated. This small bone at the tip of the sacrum is not infrequently the site of neuralgia or rheumatism (affecting the joints or adjacent muscles) or a chronic inflammation resulting from an injury sustained months or years before. These injuries usually can be traced to child-birth though occasionally such a condition will result from a fall or blow. In rare cases, neuralgia or rheumatism or inflammation may become manifest here without previous injury. Tenderness of the coccyx or a mass about any portion of it or a deformity, may be easily determined by an examination with the index finger (gloved) in the rectum and the thumb over the coccyx (Fig. 89). The examination is most conveniently made with the patient lying on her side. In this way the coccyx may be accurately outlined and any deviation from the normal determined. In some cases the coccyx appears to be normal until an attempt is made to move it, when there is severe pain, indicating trouble in the joint or about the fasciae or muscles.

INSTRUMENTAL EXAMINATION.

This term includes those manipulations in which it is necessary to use instruments. Coming under this classification are the following:

Inspection of Vagina and Cervix through the Speculum (Speculum Examination).
Excision of Tissue from Cervix for Microscopic Examination.
Exploration of Interior of Uterus with the Sound.
Exploration of Interior of Uterus with the Curet.

SPECULUM EXAMINATION.

By means of certain instruments the vaginal walls may be spread apart so that those walls and the cervix uteri may be seen. Information of much value in some cases may be obtained in this way.

Instruments for Regular Speculum Examination.

The instruments needed for this examination are shown in Fig. 90. They are as follows:

A Speculum for separating the vaginal walls;
A long Dressing Forceps for sponging out the vagina, usually called "Uterine dressing forceps;"
A Tenaculum Forceps, or "Volsellum," for catching the cervix and bringing it better into view.

Vaginal Speculum. The bivalve speculum (Fig. 90-a) is the kind most frequently used in ordinary office work. It consists of two blades, which are introduced closed and then opened by a mechanism at the handle. The vaginal walls are thus held apart (Fig. 91) and a very good view of the walls and cervix may be obtained. The bivalve speculum is convenient and gives good exposure of the cervix in most cases.

There are many different modifications of the blades and also of the mechanism for separating the blades. The most satisfactory form that I have found is shown in the illustration. It is called the Graves speculum and has the advantage that it can be easily and quickly transformed into a fairly satisfactory Sims' speculum, which is a decided convenience in office work. Three sizes are useful—small (virgin), medium and large. The cervix is easier exposed in most cases if the anterior blade of the speculum is somewhat shorter than the posterior.

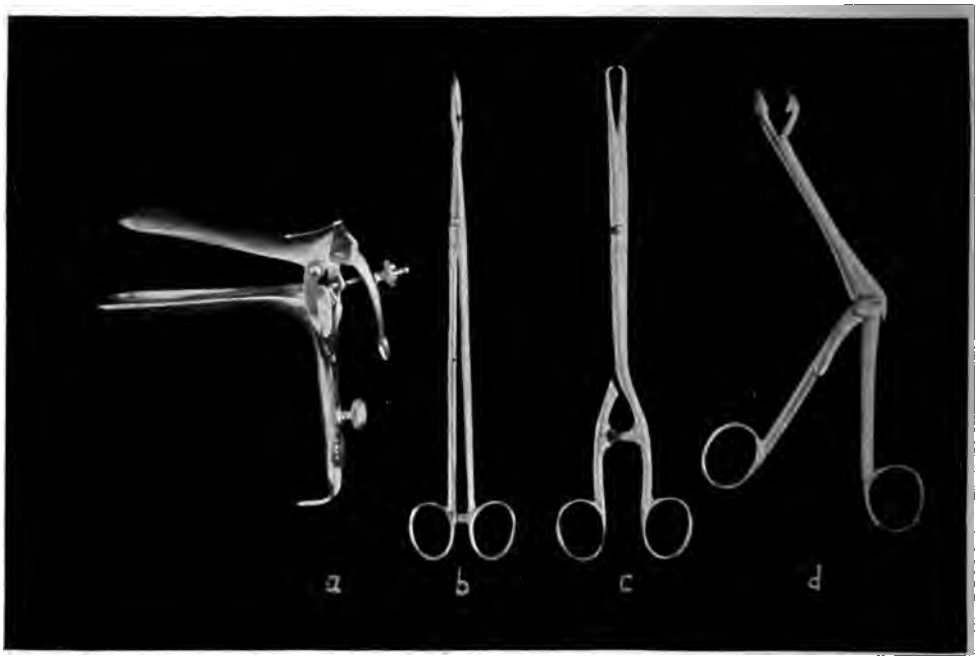


Fig. 90. Instruments for the regular speculum examination. a. Bivalve Speculum, of which it is well to have three sizes—large, medium and small. b. Dressing Forceps for swabbing out vagina. c. Tenaculum-forceps for catching cervix to bring it well into view. b. Specimen Scissors, a small strong hawk-bill scissors for clipping small specimens from the cervix in suspicious cases.

Some specula are made with three blades, instead of two, constituting a trivalve speculum. They are made on the same general principles as the bivalve but the mechanism is more compilcated and, usually, without corresponding benefit.

The bivalve speculum is used with the patient in the dorsal posture (Fig. 41). For sterilization of specula and other instruments, see Preparations for Examination, at the end of this chapter.

The **uterine dressing-forceps** (Fig. 90-b) is a long strong forceps for sponging out the vagina and for making vaginal applications. It may be straight or curved as preferred. I find the forceps with a straight shank and a slight curve near the end more convenient than the much curved instrument. A vaginal depressor for pushing the vaginal wall out of the way is usually mentioned in an examining set but it is generally not necessary, as the vaginal wall may be pushed aside sufficiently with the dressing-forceps.

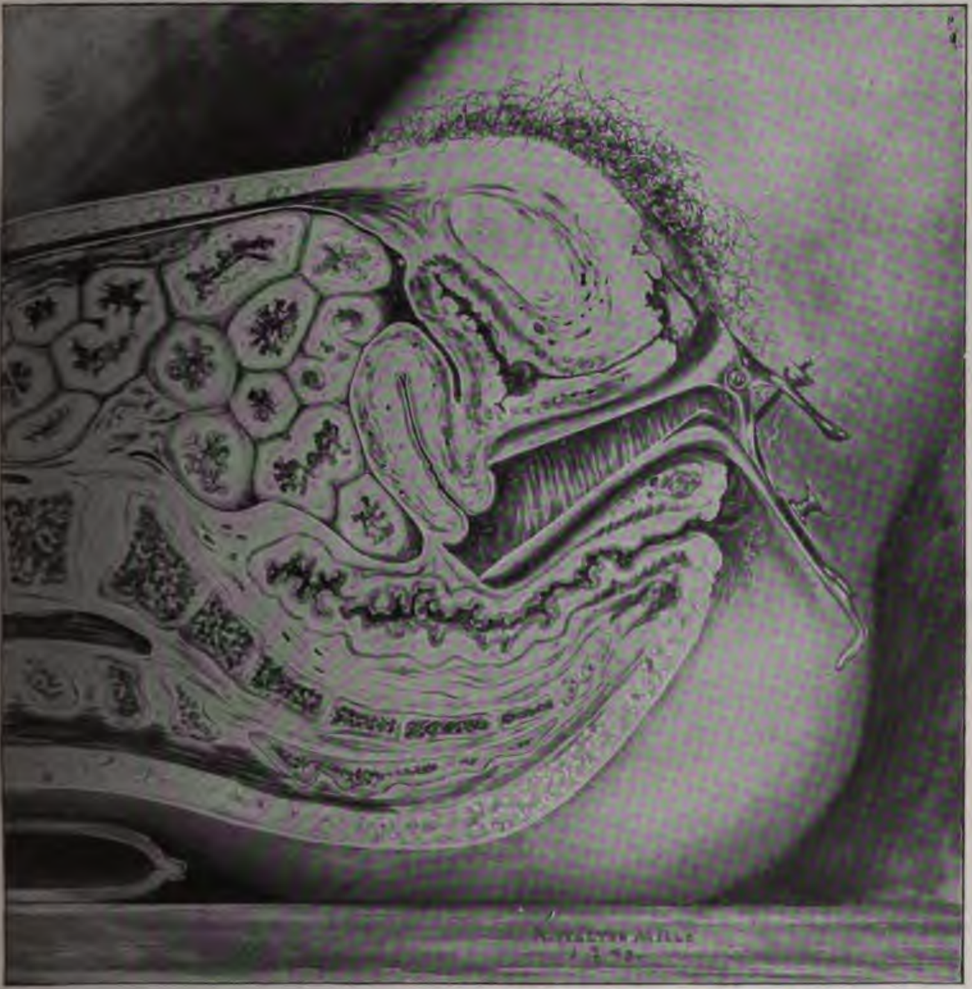


Fig. 91. Bivalve Speculum in place. Sectional view, showing relations of speculum and exposure of the cervix and vaginal vault by opening the blades.

The **uterine tenaculum-forceps** is needed for catching the cervix and bringing all parts of it into view. It should be light but strong, especially about the lock, where it is likely to work loose (Fig. 90-c).

The **specimen scissors** are for clipping out a small piece of tissue from the cervix, in cases presenting an appearance suspicious of malignant disease. The one shown in Fig. 90-d I have found very convenient and satisfactory. It presents at the end a small sharp "hawk-bill" which cuts through the firmest tissue, clipping out a small piece with but little pain or bleeding. I appropriated it from the throat specialist's armamentarium, where it is catalogued as the Miles tonsil punch.

Steps in the Regular Speculum Examination.

Introducing the Speculum. The blades of the speculum are closed and the outer surfaces lubricated and the speculum held in the right hand, while with the other hand the labia are separated and the perineum depressed somewhat with one finger (Fig. 92). The speculum is then introduced and carried all the way to the upper end of the vagina without being opened. In most cases the speculum passes the vaginal entrance most easily when held with its width almost vertical, the edge being held just far enough to one side to **miss the urethra** (Fig. 93). When well within the vagina, it is turned transversely and carried in as far as it will go (Fig. 94).

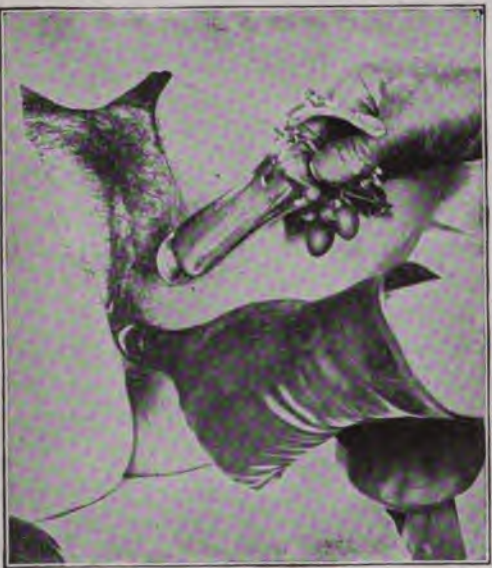


Fig. 92. Introducing the bivalve speculum. First step—depressing the perineum to give room for the speculum to be introduced.

Care is necessary that painful pressure be not made on the urethra or other structures beneath the pubic arch. Remember that when more room is required, the pressure must always be directed **against the perineum**, which will gradually yield.

Another common mistake with the inexperienced is to open the blades too soon, before the speculum has been introduced all the way. The blades are not in far enough to satisfactorily expose the cervix and in closing them again for further introduction, pain is likely to be produced by pinching the vaginal wall.

Exposing the Cervix. After the blades have been introduced well up to the top of the vagina, they are opened and the cervix and vaginal walls exposed (Fig. 91). By turning the speculum in various directions, all parts of the cervix and upper end of the vagina may be seen. If the cervix does not come well into view it may be caught with a tenaculum forceps and brought downward somewhat and turned from side to side, exposing all portions of it and of the vaginal vault.

Cleansing the Vagina. If there is secretion obscuring any part of the vaginal wall or cervix, wipe it away with cotton held in the dressing-forceps and dipped in an antiseptic solution.

Exposing Lower Portion of Vaginal Walls. To inspect the middle and lower portions of the vaginal walls, turn the speculum so as to bring the various portions of the walls opposite the opening between the blades. Another way is to inspect the various portions of the walls just beyond the end of the speculum, as it is withdrawn. Specula with skeleton blades are made, but they are not necessary and ordinarily they are likely to prove unsatisfactory in a good many cases because of the prolapsing of the redundant vaginal walls through the large openings.

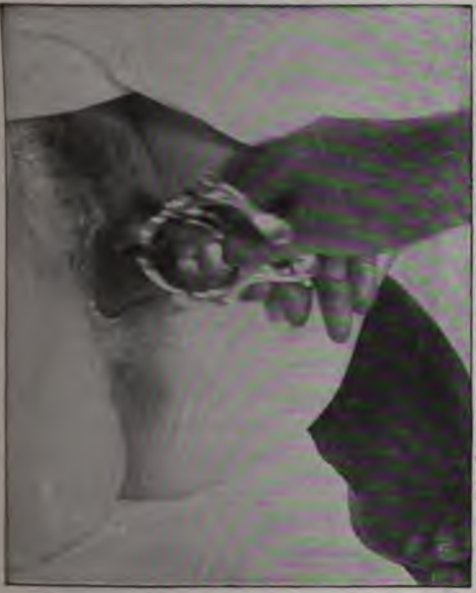


Fig. 93. Introducing speculum. It has been carried part way in. Notice the oblique position, which prevents painful pressure on the urethra.

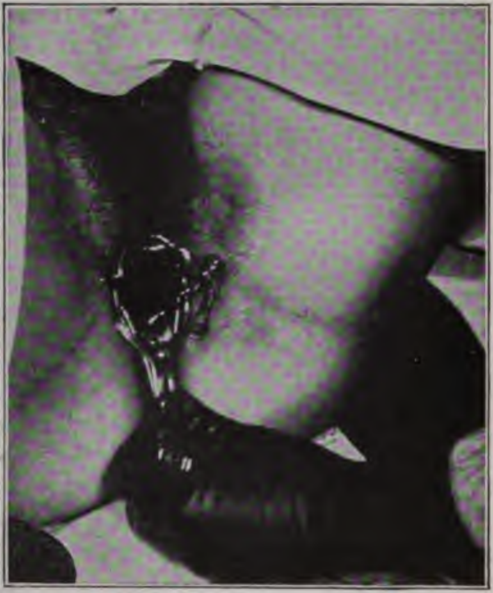


Fig. 94. The speculum carried all the way in and turned into position for opening.

Information Obtained in the Speculum Examination.

The information sought in the speculum examination is obtained by inspection of the following structures:

Vaginal Walls—Color, Discharge, Redundancy;
Cervix Uteri—Position, Color, Size and Shape, Lacerations, Deviation of Axis, Eversion, Erosion, Hypertrophy, Cystic Change, Ulcer;
External Os—Size and Shape, Color of Edges, Discharge, Polypi.

Vaginal Walls. Are the walls of normal color or is there congestion? If congestion, is it active or passive? If the walls are bright red, that means active or arterial congestion and is due to inflammation or irritation. If the walls have a bluish tinge, that means passive or venous congestion and indicates either pregnancy or some interference with the circulation, as by a pelvic tumor or exudate or by failure in compensation in heart disease.

If there is discharge, determine whether it originates in the vagina or in the uterus. If the vaginal walls are lax and redundant, they tend to collapse about the speculum.

Cervix Uteri. Is the cervix in low position, so that it is easily exposed when the speculum is in but a short distance, or is it higher than normal, so that it cannot be well exposed with the speculum of ordinary length? Is the color normal or is there congestion, either active or passive? Here, as in the vaginal wall, active congestion means inflammation or irritation and passive congestion indicates either pregnancy or obstruction of the circulation. A bright red area extending a considerable distance out from the os, is usually due to the peculiar condition called "erosion."

In regard to the size and shape, inspection may show the cervix to be:

Normal.
Long Conical.
Lacerated, but largely united again.
Lacerated and not united, but without complications.
Lacerated and everted, eroded, hypertrophied, or with cystic change or with a genuine ulcer.

Is the axis of the cervix directed ACROSS the vagina, as it should be normally, or ALONG the vagina, as in retrodisplacement of uterus or anteflexion of cervix?

External Os. The size and shape show whether or not there has been laceration and consequently are of considerable medico-legal importance in certain cases, because furnishing strong evidence for or against a previous childbirth. The color of the edges show whether they are normal or the seat of inflammation or erosion.

The discharge may be of any of the varieties previously described. There is normally a clear sticky tenacious mucus in the cervix and about the external os. The first effect of inflammation and irritation is to make this more abundant and later it becomes mixed with pus. As long as the cervical inflammation is a prominent part of the process, the tenacious, stringy quality will be a prominent feature of the discharge. If there is the least suspicion of gonorrhoea, make a spread of the discharge for microscopic examination. Occasionally a small polypus will be seen presenting at the external os or hanging by a pedicle.

Difficulties in the Speculum Examination.

Poor Light. If the light is so poor that the cervix and upper portion of the vagina cannot be seen, the ordinary head mirror, used in throat work, is of much assistance. At night, in emergency examinations and treatment, the light from a lamp may, with the head mirror, be thrown into the vagina and the landmarks easily seen.

Painful abrasions. If there are painful abrasions or fissures al [illegible] al orifice which interfere with the examination, the sensitiveness by the application of a small piece of absorbent cotton soaked in a 10% cocaine solution. Leave this in place for three to five minutes, then remove it and proceed with the examination.

Redundant Vaginal Walls. When the vaginal walls are very lax and redundant, as sometimes occurs because of subinvolution following labor, they collapse about the speculum in such a way as to hide the cervix. This difficulty may in some cases be overcome by using a longer speculum. When this does not expose the cervix satisfactorily, put the patient in Sims' posture and use the Sims speculum.

Examination with Cylindrical Speculum.

The cylindrical speculum consists simply of a tube with the outer end flaring and the inner end cut obliquely. It may be made of metal or hard rubber or glass. The cylindrical speculum is useful in certain forms of treatment, particularly when it is desired to apply to the cervix medicines from which the vaginal walls should be protected, but it is not much used in examination work.

When in the examination of a girl it is necessary to inspect the cervix, this may be accomplished without disturbing the hymen by placing the patient in the knee-chest posture and using one of Kelly's cystoscopic tubes. This is simply a small cylindrical speculum and, with the patient in the knee-chest posture, when the tube is introduced the vagina balloons out to some extent with air. Then by means of a light reflected from a head-mirror, the cervix and vaginal walls may be inspected and if necessary treated. Such an examination, however, is seldom required. In the virgin, a local examination should not be made except for urgent symptoms, and in cases with urgent symptoms the requirement is usually for a thorough bimanual examination under anesthesia, rather than for a speculum examination.

Examination with the Sims Speculum.

The Sims speculum is a perineal retractor and for use requires the patient to be put in the Sims posture. Like any other retractor, it must be held in place either by an assistant or by a mechanism (speculum holder), of which there are several varieties.

The **Sims speculum** consists of a blade, somewhat resembling a duck's bill, and a handle. As usually made two blades are placed on one handle, a large blade at one end and a small blade at the other. A further improvement is a flange near the larger blade. This flange holds the fleshy part of the right buttock up out of the way. The Graves bivalve speculum, mentioned above, is easily and quickly changed into a satisfactory Sims speculum (Fig. 95), so it is not usually necessary to get a special Sims speculum.

Sims' Posture. The principal points about the Sims posture, called also "left lateral posture" and the "semi-prone posture," are as follows:

1. All constriction must be removed from around the waist.

tient lies on her left side, with left arm and hand behind her and the
st turned toward the table as far as possible without discomfort.
sition, the upper part of the body rests on the left breast.

3. The hips rest near the lower left corner of the table and the body extends diagonally across the table toward the right side.

4. The left thigh is drawn up so that it forms an acute angle with the body, and the right thigh is drawn up still more, and allowed to drop over the lower one. This puts the patient in the position shown in Figs. 96 and 97. It permits the abnominal wall and the intestines and uterus to fall forward.

Use of Sims' Speculum. To introduce the speculum, the right labia are raised thus exposing the vaginal opening and then the speculum point, well lubricated, is carefully worked into the opening. At the same time, the perineum is pulled somewhat backward with the speculum point, in order to give more room for the point to slip in (Fig. 98). The blade is then carried all the way in. The speculum is then grasped firmly and pulled backward, thus retracting the perineum and exposing the interior of the vagina (Fig. 99).

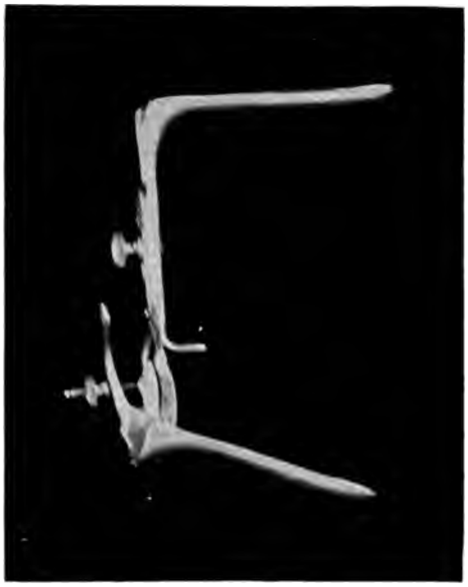


Fig. 95. Bivalve speculum changed to Sims' speculum.

As the speculum is introduced the vagina becomes distended with air, and when the perineum is retracted the cervix and anterior vaginal wall may be seen. To bring the cervix into still better view, catch it with the tenaculum-forceps and bring it slightly toward the opening (Fig. 100).

When indicated. The Sims speculum with the Sims, posture is of decided advantage in the following conditions:

1. When the bivalve speculum fails to satisfactorily expose the cervix. This may be due to the vaginal walls being so lax that they fall about the blades and obscure the cervix or it may be due to the vaginal opening being so small that the blades cannot be sufficiently separated. Again, in some cases of inflammation of the uterus or about the uterus, the bivalve speculum cannot be opened sufficiently because the anterior blade causes pain by pressure on the inflamed structures.

2. When it is desired to expose a lacerated cervix without spreading the lips apart. The bivalve speculum, as it is opened, separates the lips of the lacerated cervix, causing considerable distortion and making it rather hard to judge of the amount of eversion ordinarily present. Again, the weight of the uterus pushes the cervix into the vagina, in some cases making the cervix appear longer than it really is. In this way the bivalve speculum may lead to an erroneous diagnosis of elongation of the cervix.

3. When it is desired to expose the cervix with the least possible stretching of the vaginal opening. The vaginal opening may be so tender that the bivalve speculum cannot be satisfactorily opened. Again, in removing cervical sutures

after simultaneous repair of both cervix and perineum, it is important to avoid stretching the newly healed perineum. In these cases, a narrow Sims speculum introduced in the Sims posture, causes the vagina to balloon and exposes the cervix and vaginal vault with much less stretching of the vaginal orifice than would be necessary with the bivalve speculum.

4. When it is desired to sound the uterus or to dilate the cervical canal or to make an intrauterine application.

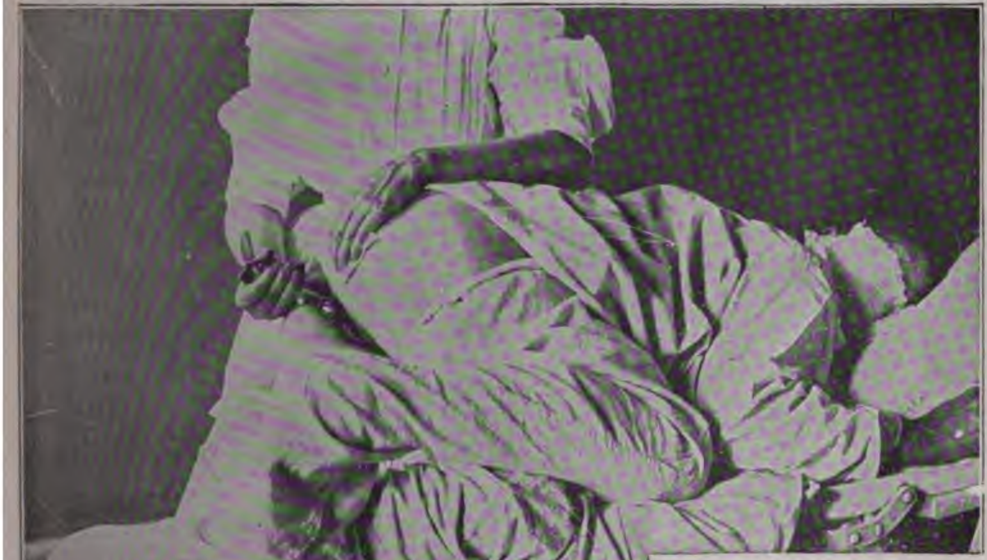


Fig. 96. Patient in Sims' posture. Notice how the upper knee drops over the under one.

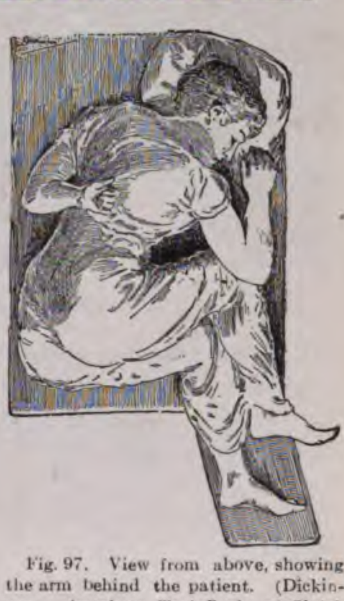


Fig. 97. View from above, showing the arm behind the patient. (Dickinson — *American Text-Book of Obstetrics.*)

5. When the vagina is to be packed, either for holding the uterus forward or for hemorrhage.

6. In clearing out the uterus with the curet for incomplete miscarriage. In many such cases where the miscarriage has just taken place, if the patient be placed in the Sims posture and all the manipulations made carefully, the uterus may be thoroughly cleared out with but little pain and hence without an anesthetic.

7. When treating a sinus or abscess opening in the posterior vaginal fornix. When making the incision back of the cervix for pelvic abscess, the dorsal posture is the better one, as the cervix may be held out of the way by strong traction, but in the after-care of the case, the Sims posture is usually preferable. It causes the patient less pain and gives much better exposure of the opening back of the cervix.

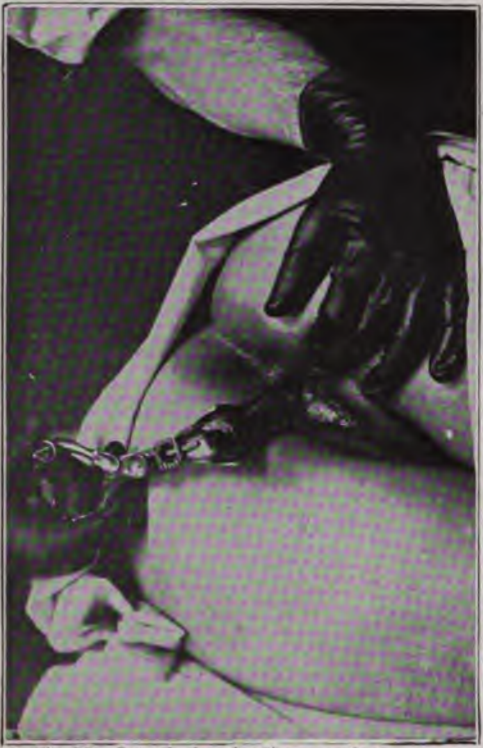


Fig. 98. Introducing the Sims speculum.

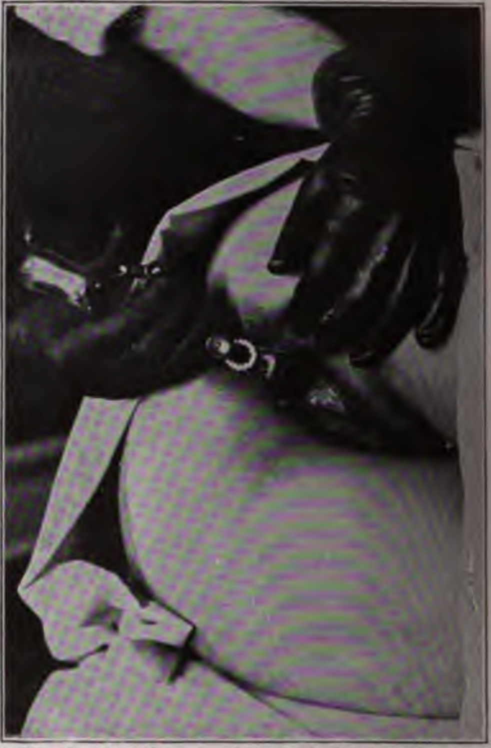


Fig. 99. Speculum in place, and showing also the method of holding the same and of keeping the upper buttock out of the way.

EXCISION OF TISSUE

FROM CERVIX FOR MICROSCOPIC EXAMINATION.

In many cases the naked-eye examination of the cervix is not sufficient to make a positive diagnosis between malignant disease and certain other affections of the cervix. In a suspicious case, particularly one that resists treatment, a small piece of the affected area should be excised for microscopic examination. A very convenient instrument for this purpose is the specimen scissors shown in Fig. 90. With this a small piece of the suspicious tissue may be clipt out of the cervix. If there is much bleeding, a suture may be placed under the bleeding surface and tied. Usually however a styptic application, with a firm vaginal packing, will stop the bleeding. The specimen excised from the cervix and also all curettings should at once be placed in a small bottle of alcohol (95%) or formol (10%) and forwarded to the pathologist.

EXPLORATION OF UTERUS WITH SOUND.

Through the speculum the interior of the uterus may be explored with the uterine sound. The uterine sound (Fig. 101-a) is pliable so that it may be bent to accommodate it to the uterine canal in different cases. It is graduated so that the exact depth of the canal may be told. It has a bulbous end so that there will be less danger of its puncturing the uterine wall.

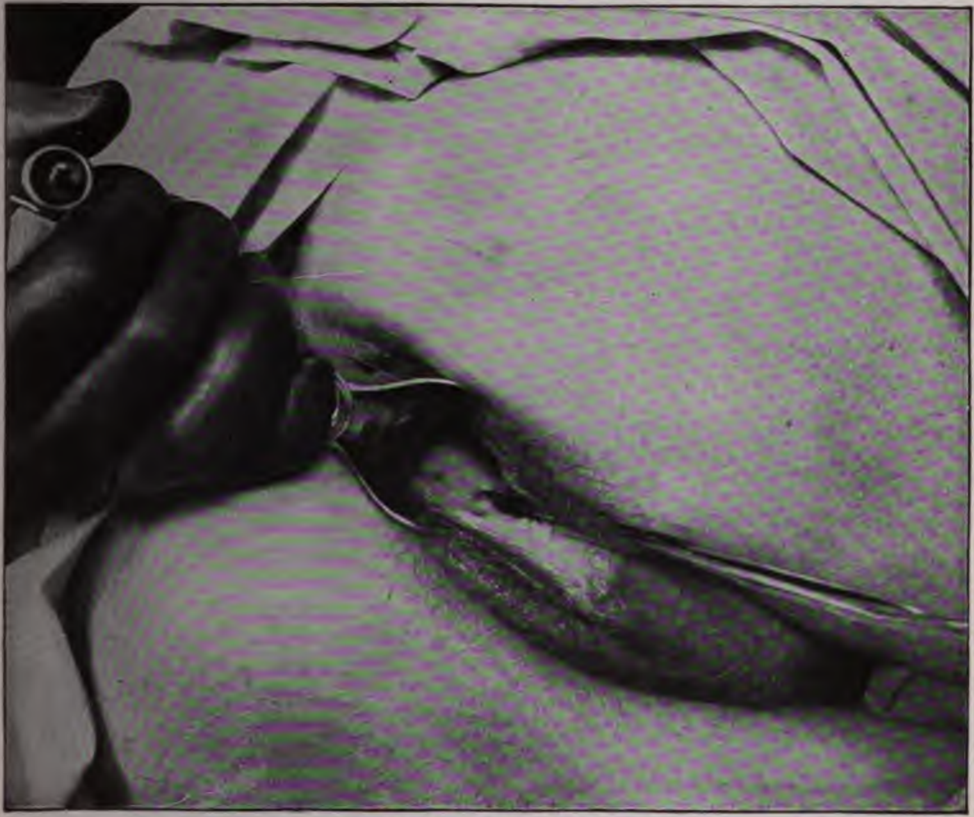


Fig. 100. Cervix caught with tenaculum-forceps and brought into view.

Introduction of Uterine Sound.

The sound **should not be introduced by touch**, as was formerly the custom and as is shown even in some recent text-books, for when used in that way is is very liable to carry infection into the uterus. Before sounding, the **speculum** should be introduced, the cervix exposed and caught with a tenaculum-forceps and the cervix and vicinity cleansed with a reliable antiseptic solution. Then the sterile sound is introduced into the uterus without touching the vaginal wall. Before introducing the sound the approximate location of the fundus uteri should be determined by bimanual examination and the sound should be shaped and guided accordingly. The sound can usually be most conveniently introduced with the patient in the Sims posture and the cervix exposed with the Sims speculum. After the sound is sterilized **do not touch** the intrauterine portion with the fingers. If the end requires bending, dip a piece of absorbent cotton in a reliable antiseptic solution and grasp the uterine portion of the sound with this for bending. **No force** should be used in the introduction of the sound, other than is necessary to overcome a very slight stenosis. If the sound does not pass easily in the supposed direction of the canal, withdraw it slightly and try in other directions. If it does not then pass easily or if it causes much pain it should not be used further.

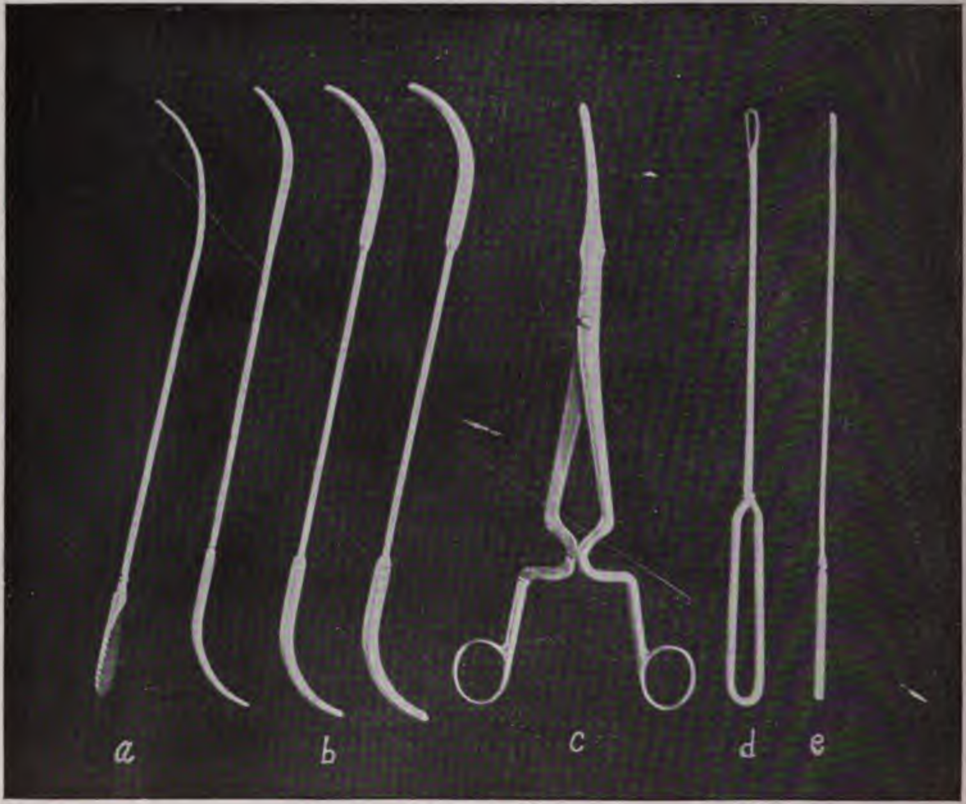


Fig. 101. Instruments for exploring the interior of the uterus. a. Uterine sound. b. Three graduated metal dilators for enlarging the cervical canal. c. Small branched dilator. d. Small exploring curet. e. Intra-uterine applicator.

Information Obtained by Uterine Sounding.

As mentioned later, the introduction of the uterine sound is dangerous and rarely necessary. When it is necessary to use it, the information obtained should cover the following points:

Size and Shape of Cervical Canal. Is there stenosis? If so, is it located at the external os or the internal os or between the two? Is there anteflexion of cervix? This is indicated by a sharp bend forward of the canal at the internal os. In such a case, even when there is no obstruction, the sound often stops at this point because it impinges on the posterior wall of the canal, and if force were used the wall would be injured. Curve the sound sharply so as to throw the point forward in a direction to pass the bend.

Position of Body of Uterus. Does the point of the sound pass in the direction normally occupied by the uterine canal or is the canal, and consequently the body of the uterus, displaced? If so, is the displacement backward or forward or lateral? The direction of the canal helps also in determining which of two masses in the pelvis is the uterus, in cases in which this cannot be otherwise determined.

Length of Uterine Cavity. Is there enlargement of the uterus? If so, to what extent? In chronic inflammation and in subinvolution there is slight enlargement. In tumors, particularly in large intramural fibroids, there may be great elongation and distortion of the canal.

Pain. There is usually some pain as the sound passes the internal os. In certain cases of inflammation and of neuralgic trouble, the pain is much increased and the excessive tenderness may extend to the entire endometrium.

Bleeding. A drop or two of blood may follow sounding when the uterus is normal, but many drops or a slight stream following careful sounding, indicates a pathological condition of the endometrium.

Contra-indications to Uterine Sound.

There is considerable danger in the use of the sound, even when handled with care. It may carry infection into the uterus or it may, by the irritation, stir to activity a chronic inflammation or it may injure the wall of the canal or it may perforate the uterus and enter the peritoneal cavity. The danger of perforation is especially marked in a uterus recently pregnant or the seat of malignant disease. When proficiency in the bimanual examination is acquired, the introduction of the uterine sound will seldom be necessary.

Remember the following rules as to sounding the uterus

> Do not sound unless their is some special reason for it.
>
> Do not sound when there is active inflammation in the vagina or cervix with the body of the uterus free or when there is an acute or subacute salpingitis.
>
> Do not sound when there is a suspicion of pregnancy.

If not extremely careful, you are liable in some doubtful case to inadvertently sound a pregnant uterus and cause serious trouble for the patient and for yourself. To avoid this, it is a good plan always, just before introducing the sound, to ask the patient, "When did you menstruate last?" and to ask yourself, "Is there any suspicion of pregnancy in this case?" If there is suspicion of pregnancy, put the patient on some treatment that cannot interfere with pregnancy and watch the case until the next menstrual period. If you doubt the patient's statement that she is menstruating regularly, tell her that you must see her when menstruating the next time, that you may determine the nature of the flow. In that way you can determine whether or not she really menstruates.

EXPLORATION OF UTERUS WITH CURET.

The exploration of the interior of the uterus with the curet, without anesthesia, is for the purpose of removing pieces of tissue for microscopic examination. Usually curetment under anesthesia is preferable. In some cases, however, there are contra-indications to anesthesia or for some other reason it is thought best to try to secure some tissue for microscopic examination so that a diagnosis may if possible be made before giving an anesthetic.

The curet used for such exploration should be small and should have a sharp cutting edge (Fig. 101-d).

Method of Procedure.

The preparations are the same as for sounding the uterus—in fact, exploration with the sound should immediately precede exploration with the curet. The slight dilatation required and the subsequent exploration with the curet, are usually best carried out with the patient in Sims' posture.

In some cases the cervix will readily admit this small curet without dilatation. Usually, however, some dilatation is necessary and this is most easily effected with the graduated dilators (Fig. 101-b) of metal or hard rubber. Beginning with the small size, the dilators are introduced one after another until the required dilatation is secured. The cervix is caught and steadied with a tenaculum-forceps, while dilatation is being made. As a substitute for uterine dilators, the ordinary steel bougies for the male uretha do very well in most cases. If preferred, the dilatation may be effected with a small bladed dilator (Fig. 101-c) or a curved uterine dressing-forceps. The bladed instrument is introduced closed and then gradually opened sufficiently to give the required dilatation. This is more painful usually and less convenient than the graduated dilators. All the manipulations should be made gently, and nothing more than slight dilatation should be attempted, as it would cause too much pain. This dilatation without anesthesia is not practicable in the virgin, ordinarily, though in some cases it can be carried out very well.

A method of securing a wider opening by slow dilatation is by packing the cervical canal with antiseptic gauze. If carried out carefully this is safe, and is sometimes effective. Under the same antiseptic preparation as for the other methods of dilatation, a thin strip of gauze is introduced into the uterus, past the internal os if possible, and the cervical canal is packed firmly with it, the end being left out of the cervix. This is held in place by a vaginal packing of the same material. The patient should go to bed as soon as she reaches home and remain there until the time for the next treatment. In twenty-four hours the packing is removed and the cervical canal is found considerably softened and dilated.

Formerly tents were much used for dilating the cervix. Such a tent was simply a dry cone of some substance which, when moist, gradually expanded with sufficient force to dilate the cervix. The dilatation required several hours and sometimes several days, the patient in the meantime being given morphine on account of the pain. The substances used were sponge, laminaria and tupelo.

Many deaths were caused by infection resulting from the use of tents, and even in skilled hands and with all the modern antiseptic precautions, tents still cause serious trouble at times. Consequently their use has been almost abandoned. If used at all, the tent should be covered with a sterilized rubber tent cover.

After the required dilatation has been secured, the curet is introduced and portions of the diseased endometrium removed for microscopic examination. If there is persistent bleeding after the use of the curet, an intrauterine application of a 10 per cent copper sulphate solution may be used. If the bleeding still persists, a small piece of antiseptic gauze should be packed firmly into the uterine cavity and the vagina also packed with gauze. The gauze may be removed in two days and an antiseptic vaginal douche given once or twice daily for a few days.

Contra-indications. The use of the curet for diagnosis is contra-indicated by the same conditions that contra-indicate the sound. The use of the curet without anesthesia, as just described, is not nearly as satisfactory as the regular curetment under anesthesia.

PELVIC EXAMINATION UNDER ANESTHESIA.

The advantage of anesthesia is that it eliminates PAIN and MUSCULAR TENSION, the two factors that make the ordinary pelvic examination incomplete and unsatisfactory in certain cases.

Preparations.

In preparation for this examination the patient's bowels should be moved with a purgative on the previous day and the rectum should be cleared out with an enema an hour or two before the examination. The same preparatory examination of the heart, lungs and urine should be made as though the anesthesia were for an operation. Have ready a light strong tenaculum-forceps, so that the cervix may be caught and the uterus pulled down as desired. If the interior of the uterus is to be explored, the antiseptic preparation for curetment must be carried out.

Examination Methods.

The various manipulations employed in examination under anesthesia are as follows:

Vagino-abdominal palpation,
Recto-abdominal palpation,
Recto-vagino-abdominal palpation,
Recto-vesical palpation,
Curetment,
Exploration of interior of uterus with finger,
Excision of piece of cervix for examination.

VAGINO-ABDOMINAL PALPATION.

In vagino-abdominal palpation under anesthesia, the same manipulations are employed and the same facts concerning normal and abnormal pelvic structures are sought, as in the ordinary vagino-abdominal (bimanual) examination. Under anesthesia, however, the examination is much more thorough. Deep palpation may be made in all portions of the pelvis, and the uterus, tubes, ovaries and abnormal masses may be clearly outlined in nearly every case. The position, size, shape, consistency, mobility and attachments of a pelvic mass may be determined with far more accuracy than without anesthesia.

In all doubtful cases, this method of examination should be employed before subjecting the patient to abdominal section.

In the examination under anesthesia, the manipulations must always be made carefully and gently, otherwise a collection of pus may be broken open internally, causing peritonitis, or the sac of a tubal pregnancy may be ruptured, causing fatal hemorrhage.

RECTO-ABDOMINAL PALPATION.

The recto-abdominal palpation under anesthesia is made for the same purpose as the vagino-abdominal palpation and in the same way except that two fingers of the gloved hand are introduced into the rectum instead of into the vagina.

Much additional information may be in this way obtained in some cases because, under anesthesia, the fingers can pass further up the posterior surface of the uterus. By catching the cervix with a tenaculum-forceps and pulling the uterus downward, the posterior surface of the uterus and the ovaries and the broad ligaments may be palpated with but little intervening tissue.

To get the full benefit from this method, particular attention must be paid to details. After the patient is well under the anesthetic and as much information as possible has been secured by vagino-abdominal palpation, then make the recto-abdominal examination as follows:

1. Cleanse the rubber glove from all vaginal secretion or put on a fresh one (that no infection be carried into the rectum), and lubricate the glove with a drop or two of liquid soap. If the bare fingers have been used for vaginal examination, cleanse them and put on a rubber glove. If no rubber glove is at hand, fill the space under the nails of the examining fingers by scraping across a bar of soap and then lubricate the fingers with a drop or two of liquid soap or with an abundance of vaseline or other bland ointment. If no rubber glove is worn, the examining fingers should, immediately after the examination, be dipped at once (before putting them in soap and water) into a strong antiseptic solution (e. g., bichloride 1–1000) and scrubbed in that with a piece of cotton. After that they are put through the regular scrubbing with soap and water and a brush. This immediate cleansing in a strong antiseptic solution before the regular scrubbing with soap and water, aids in removing the odor.

2. Introduce two fingers into the rectum. Under the anesthetic, the sphincter ani is readily dilated to admit the two fingers as they are carefully worked in. A much more thorough recto-abdominal palpation of the pelvic interior may be made with two fingers in the rectum than with only one.

The fingers are worked past the rectal folds, up between the sacro-uterine ligaments, which serve as landmarks, and then as far up beyond as possible. The anus and pelvic floor are pushed into the pelvis as far as they will go, by firm p

sure against the elbow of the examining arm, the elbow resting on the knee or against the hip, as in deep vagino-abdominal palpation. In this way the tips of the examining fingers may be carried far up into the posterior part of the pelvis.

There may be some difficulty in finding the rectal canal in the region of the sacro-uterine ligaments. Sometimes the interior of the rectum feels like a large pouch without any opening extending higher. If you are satisfied to make the pelvic palpation by attempting to carry up the wall of this pouch, you will be much hampered. By locating the cervix uteri and then the two sacro-uterine ligaments and working round to get past the rectal valves and folds, a small opening will be felt extending upward between the sacro-uterine ligaments. Follow this up (it dilates easily) and you will find further progress unobstructed. The fingers are carried as high as they will go and then the abdominal wall is depressed from above by the other hand (Fig. 102).

3. The various structures in the posterior and central parts of the pelvis are then caught between the hands and outlined and otherwise examined by palpation, one at a time. The palpation proper is made principally with the rectal fingers, the abdominal fingers serving simply to push down the structures to within reach of the fingers below. In this palpation, the guide is the body of the uterus. The fingers pass up the posterior surface of the uterus to the fundus and then out to the lateral region of each side, palpating the tube and ovary and any abnormal mass. In a patient with only a moderately thick abdominal wall, the ovaries and tubes may be distinctly outlined, unless they are obscured by adhesions or by an inflammatory mass or by a tumor.

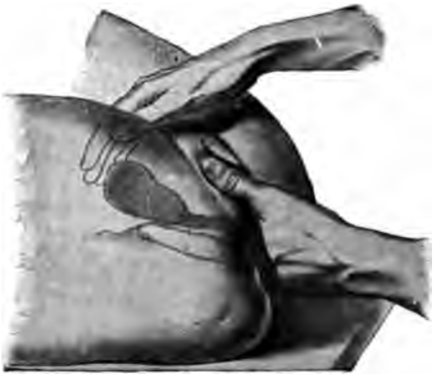


Fig. 102. **Recto-abdominal palpation. The hand should be gloved.** (Montgomery — *Practical Gynecology.*)

4. Then catch the cervix with a tenaculum-forceps and draw it down gently, and have someone hold the forceps to keep the uterus in the downward position. This drawing downward and forward of the cervix, throws the fundus backward so that it is caught between the rectal fingers and the abdominal fingers, and its size, shape, consistency, mobility and attachments may all be accurately made out.

The fingers then pass to the adnexa, determining the same points concerning them.

If there is a movable mass of doubtful origin, have some one catch it from the abdominal surface and pull it up towards the abdominal cavity so that the examining fingers (rectal and abdominal) may meet between the mass and the pelvic structures. In this way, the pedicle of the mass (if it arises from the pelvis) may be felt and traced to its origin, and also its length and thickness determined (Fig. 103). This is sometimes referred to as Hegar's method of examining the pedicle of a tumor.

Particular care must be exercised that the structures be not injuriously pressed or pulled upon, for as the patient is anesthetized the usual warning complaint of pain is absent. There are three points that it may be well to mention particularly:

(a) Do not use much force in palpation. A pus sac may be broken, causing peritonitis, or a tubal pregnancy may be disturbed sufficiently to cause a fatal hemorrhage. In fact, a patient with suspected tubal pregnancy should not be examined under anesthesia until she is gotten to the hospital or until things are ready in the home, so abdominal section could be carried out immediately should threatening symptoms arise during the examination.

Again, if much force is used the examining fingers may be pushed through the rectal wall into the peritoneal cavity. Kelly mentions cases in which this accident occurred and in which immediate abdominal section, or vaginal section, was carried out to repair the rent in the bowel-wall and prevent fatal peritonitis.

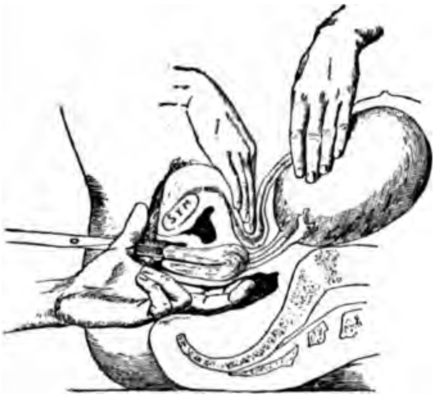


Fig. 103. Palpating the pedicle of a tumor, with the tumor pushed up into the abdominal cavity and the uterus caught with a tenaculum-forceps and pulled downward. (Montgomery—*Practical Gynecology.*)

(b) Do not draw down the uterus very far nor very forcibly, for reasons already given. I make it a rule to bring the uterus down no further than is absolutely necessary to satisfactorily palpate it. In most of these cases all that is necessary is a slight downward displacement, that permits the fundus to go somewhat back-ward so that it can be grasped well between the rectal fingers behind and the abdominal fingers in front. The extreme downward displacement of the cervix, to the vaginal entrance or even outside, is not necessary nor advisable, except in cases where there is already prolapse of the uterus. The occasion for it does arise if the fingers are carried up the rectum by invagination of the pelvic floor, as above described.

(c) The suggestion to use the whole hand in the rectum for exploration in difficult cases, was long ago made and carried out with disastrous results. This method should not be used. It has led to rupture of the rectum, with fatal peritonitis. Furthermore, no need for it is experienced if the palpation with two fingers is carried out with close attention to the details above given.

RECTO-VAGINO-ABDOMINAL PALPATION.

In some cases, additional information may be obtained by this method. With the two fingers in the rectum, the thumb of the same hand is passed into the vagina and the lower part of the pelvic mass or of the uterus is grasped between the fingers and the thumb, the structures being pressed down within reach by the abdominal hand (Fig. 104).

In some cases, this is of decided assistance in outlining a small mass low in the pelvis and in determining the exact consistency of different parts of it. In certain cases, where there is a wide vaginal opening and relaxed pelvic floor, the examiner may palpate the uterus or other mass low in the pelvis, with almost as much accuracy as though it were removed and lying free in the hand.

A modification of this method is to introduce the middle finger into the rectum and the index finger into the vagina and palpate the structures between the fingers as the uterus is pushed down from above. This method of recto-vagino-abdominal palpation has been found useful in determining the extent of involvment of the parametrium in cases of carcinoma of the cervix uteri.

RECTO-VESICAL PALPATION.

In the recto-vesical palpation under anesthesia, a medium sized urethral bougie (about 21 F) is introduced into the bladder, and one or two fingers into the rectum. The tissues between the rectum and the end of the bougie are carefully palpated by the rectal fingers. This method is used in only two conditions—(a) in determining the presence or absence of the uterus in cases of atresia of vagina and (b) in distinguishing between inversion of the uterus and a large pedunculated fibroid hanging from the cervix. In a very stout patient, this method may be the only means of making a positive diagnosis in the classes of cases mentioned. If the bladder is not irritable, this method may be employed gently without anesthesia, but the examination under anesthesia is far more satisfactory.

Caution. Palpation with the finger introduced through the dilated urethra, I mention only to condemn. It is dangerous in that it is liable to cause permanent incontinence of urine, a condition which resulted in several reported cases.

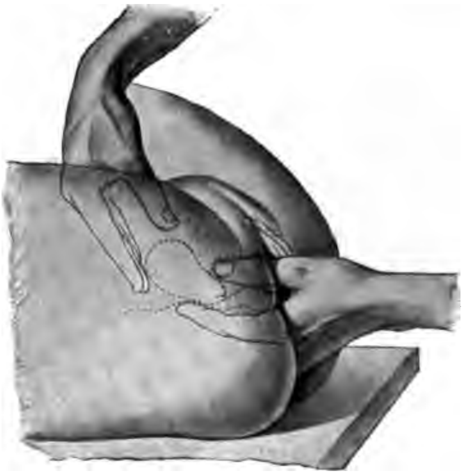


Fig. 104. Recto-vagino-abdominal palpation. One or two fingers of the gloved hand are introduced into the rectum and the thumb into the vagina, and the uterus, or other mass low in the pelvis, is grasped between them, as it is pushed down by the abdominal hand. (Montgomery—*Practical Gynecology*.)

CURETMENT UNDER ANESTHESIA.

Curetment for diagnostic purposes is carried out the same as regular curetment for therapeutic purposes. By it tissue is obtained from all portions of the endometrium for microscopic examination. As previously stated, this is much more satisfactory than the partial curetment without anesthesia, for by the curetment under anesthesia tissue is removed from practically all parts of the cavity. Consequently, if in the subsequent microscopic examination no malignant tissue is found, we may be fairly certain that there is no malignant disease. Furthermore, regular curetment under anesthesia combines with its diagnostic value a decided therapeutic effect, for it removes the diseased endometrium and diminishes bleeding and discharge. As will appear later, curetment is often indicated in a particular case by both therapeutic and diagnostic considerations. For example, when a patient has uterine bleeding or discharge that resists ordinary treatment, curetment is indicated to stop the bleeding or discharge and also to furnish tissue for microscopic examination.

Of the various conditions that give rise to persistent bleeding and discharge the following produce characteristic changes in the endometrium:

Chronic endometritis,
Malignant disease (carcinoma, sarcoma),
Tuberculosis of the endometrium,
Recent abortion.

There are other conditions, for example, extrauterine pregnancy, in which the microscopic appearance of the curettings is not pathognomonic but in which the information obtained in this way, added to the symptoms, may make the diagnosis positive in an otherwise doubtful case.

Collecting Curettings.

In a diagnostic curetment, observe the following points:

1. Remove the endometrium from all parts of the uterine cavity.

2. Put all the curettings into a small vessel immediately and shake with water to remove blood-clots. If the water is so bloody that it is desired to change it for further washing, it is poured through gauze. The gauze catches the curettings, which are then emptied into fresh water. The water into which curettings are placed should be clear and clean. Normal saline solution is preferable to plain water as it causes less swelling of the cells, hence it should be used for the washing when the curettings are to be subjected to any particular or special examination.

3. Then transfer all the tissue fragments, without compression, to the small bottle containing 95% alcohol or 10% formol solution and send to the laboratory.

4. If the pathologist is in a distant city, the little bottle should be corked securely and put in a mailing tube or wrapped with cotton and otherwise packed securely for safe transmission.

5. With the specimen, send a note stating the nature of the specimen (curettings from within uterus), when obtained, name and age of patient and some of the important facts in the history of the case.

EXPLORATION OF UTERINE CAVITY WITH FINGER.

Exploration of the interior of the uterus with the finger may be employed when satisfactory information cannot be obtained otherwise. The cervix may be dilated in the same manner as for curetment, i. e., with a strong bladed dilator, but the dilatation must be carried much further, as it takes a larger opening to admit the finger than to admit the curet. The dilatation required for satisfactory exploration with the finger must be so wide that it is only in exceptional cases that it can be secured in the non-puerperal uterus with the ordinary dilator.

To secure satisfactory dilatation, Schatz's metranoikter may be used. This consists of two blades separated by a strong spring. They are introduced into the cervix closed. The removal of the introducing handle releases the spring which gradually effects wide dilatation of the cervix, within twelve to twenty-four hours. The pain is controlled by morphine. This instrument causes wide dilatation and may be used in preparation for examination under anesthesia where for some particular reason it is desired to palpate the interior of the uterus. It may be used also to dilate the cervix for curetment without anesthesia or even for exploration of uterus with the finger without anesthesia.

Hirst has modified the Schatz metranoikter, making it with four blades instead of two.

A more certain and satisfactory method, when the patient is given an anesthetic, is to dilate the cervical canal to the usual extent with the regular bladed dilator and then divide the wall of the cervix with a knife or scissors, in the median line anteriorly up to or above the internal os. The bladder must of course first be separated from the cervix and pushed up out of the way. This allows a thorough exploration of the interior of the uterus with the finger. It is a rather formidable procedure for exploration alone and usually is employed only after preparations have been made to do a hysterectomy or other operation immediately after the exploration, if such is found necessary.

After sufficient dilatation has been obtained by one of the methods mentioned, the finger is introduced into the uterine cavity and the walls palpated, the uterus at the same time being pushed downward and steadied by the other hand the same as in bimanual examination. Some additional information may be obtained by this method, for example, we may determine the presence of irregularities of the uterine wall, of projecting growths, of softened or broken down places or of areas of induration.

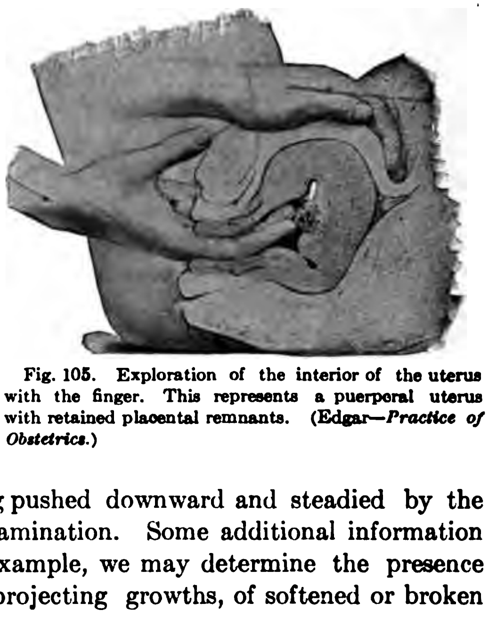


Fig. 105. Exploration of the interior of the uterus with the finger. This represents a puerperal uterus with retained placental remnants. (Edgar—*Practice of Obstetrics.*)

Exploration of the uterine cavity with the finger is seldom necessary in the nonpuerperal uterus. In all but exceptional cases, the diagnosis may be made without it. In the puerperal uterus, it is exceedingly useful for determining the presence of placental remnants (Fig. 105) and for safely clearing out the same. In the recently pregnant uterus no special dilatation measures are necessary because the cervix is so soft that abundant dilatation is secured with the ordinary bladed dilator or in some cases even with the finger alone.

EXCISION OF TISSUE FROM CERVIX.

Excision of a piece of tissue from the cervix for microscopic examination may be quickly car [illegible] following curetment or other exploratory examination, when thought advisable. In this way a positive diagnosis of malignant disease of the cervix may be made in the early stage. This aid to diagnosis should be carried out during the examination under anesthesia whenever a suspicious ulcer or induration is present. A small wedge-shaped portion of the suspicious area, including some healthy tissue, is excised and the wound thus made is closed by one or two sutures. The sutures should be left in about ten days, the patient in the meantime receiving one or two antiseptic douches daily. She need not remain in bed.

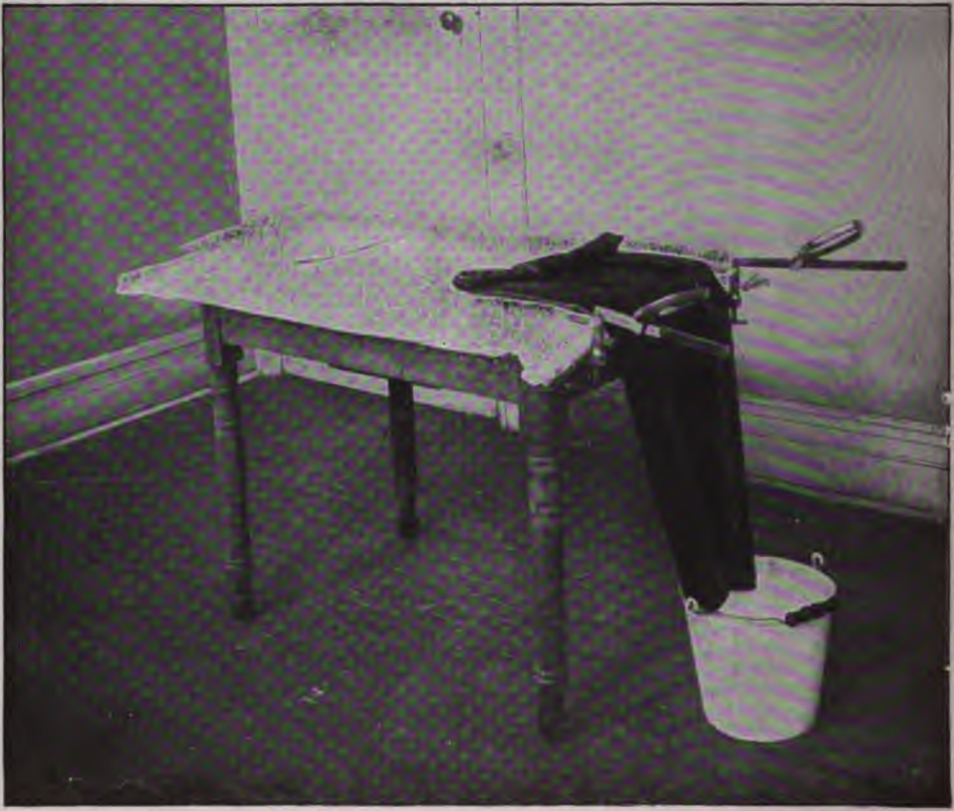


Fig. 106. Kitchen table, with portable foot-rests attached ready for a gynecological examination.

PREPARATIONS FOR GYNECOLOGICAL EXAMINATION.

The various points considered under this head may be grouped as follows:

- Office Arrangements.
- Directions to Patient.
- Antiseptic Preparations.
- Soap, Brushes, Lubricant.
- Use of Rubber Gloves.
- Avoid Unnecessary Exposure.
- Preservation of Specimens.
- Examination on Bed.

OFFICE ARRANGEMENTS.

There are three things of particular importance in the handling of gynecological patients:

1. **Screened Area in the consulting room.** The portion of the room that is used for the examination should be suitably screened from the other part, so that the patient may remove the corset and make such other arrangement of the clothing as she wishes, in privacy. It is very convenient to have a separate room for the examining-room, with an attached toilet-room. Where no separate room is available, a neat substantial screen, affording the patient privacy for the required preparation, does very well and is inexpensive.

2. **Table.** A satisfactory table for gynecological examinations is the regular surgical chair with foot-rests. The advantage of the foot-rests is that the patient's hips may be brought to the end of the table without her feet being forced so near the buttocks as to be uncomfortable.

In the absence of the surgical chair, portable foot-rests may be attached to a plain kitchen table (Fig. 106). With these portable foot-rests are furnished also tall uprights for use as leg-holders, by which the feet and legs may be held out of the way during examination under anesthesia or during an operation. They are convenient for use during minor operations at the patient's home (Fig. 572).

3. **Nurse.** When a physician is doing much gynecological work it will be found a wise investment to have a nurse, to prepare the patients for examination and to prepare the necessary articles needed in office examination and treatment. Aside from the great convenience to the physician, it makes the patients more at ease and in addition tends to protect the physician from blackmail by designing persons. Where a nurse is not required for other work, she may be hired just for the office hours and thus the expense reduced.

DIRECTIONS TO PATIENT.

Direct the patient to remove the corset and loosen all bands about the waist, so that the clothing may be pushed up and down sufficiently to bare the abdomen. This is necessary at first, for the first examination should be thorough, including examination of the entire abdomen as well as the pelvic exploration. Examination of the breasts may be necessary in cases of suspected pregnancy. If there are indications of disease of the heart or lungs, those organs also should be examined, and the same is true of the nervous system.

In the subsequent visits, it may not be necessary to remove the corset or loosen the clothing, depending of course on what treatment or further examination is required. It is not necessary in ordinary cervical or vaginal treatments. Any treatment however necessitating deep bimanual palpation, such for example as replacement of a retro-displaced uterus, requires the removal of the corset and lo [illegible] bands.

[illegible]: the abdominal examination, direct that the hips be brought [illegible]. The patient is covered with a clean sheet and under the sheet the skirts are pushed up above the knees and out of the way. The sheet is then parted so as to expose the genitals only, being draped so as to cover other parts. It is well, as a rule, to inspect the genitals, for often information of value is obtained in cases where the history gives no intimation of disturbance externally. If it is thought unnecessary to inspect the genitals, the hand is carried under the sheet for making the vaginal and vagino-abdominal examination.

ANTISEPTIC PREPARATIONS.

If you wish to protect your patient and likewise your hands from the danger of infection, certain antiseptic precautions must be taken. The necessary measures are simple and easily carried out, and if employed regularly become more or less of a habit.

The needed disinfection will be indicated by naming the dangers to be avoided, which are as follows:

1. Infection of the patient from your hands. If your hands are well cleansed before each examination, there can be no infection from them.

2. Infection of your hands from the patient. If there is a scratch or abrasion anywhere about the fingers, the hand should be covered with a rubber glove (Fig. 53). If no rubber glove is at hand, a rubber finger-cot should be slipped over the abraded finger or the abrasion covered with collodion spread over a few fibers of cotton. If the collodion rubs off during the examination of a patient with syphilis or chancroid or other infectious disease, the abrasion must be immediately touched with pure carbolic acid or nitric acid and again covered with collodion. We hear a great deal about the danger of the patient becoming infected, but very little about the danger to the physician; and yet I suppose there are few physicians of experience who do not number among their professional friends, one or more who have become infected with syphilis through abrasions of the hands. Dudley states that he is acquainted with not less than twenty physicians who have been infected with syphilis through abrasions of the fingers in digital examinations. Each physician must look out for himself and his family. Remember that "prevention is better than cure," and, it may be added, a great deal easier.

3. Infection of the patient from instruments. If the instruments are sterilized each time before use, there can be no danger from them.

4. Infection of the patient from the table. To prevent this, place under the patient's hips a rubber pad or piece of rubber cloth and over that a clean folded towel, which is changed with each patient.

Precautions. The precautions to be taken in order to avoid infection may be summed up in three rules, as follows:

1. **Disinfect and Protect the Hands.** Trim the finger-nails short and clean under them. Cleanse the hands well with soap and water and dry them with a clean towel. Protect any abrasion on the hand with a clean rubber glove.

If there is any break in the protecting epithelial layer of the vulva or vagina or cervix, or if the interior of the uterus is to be explored, the hands should be further cleansed in 1–2000 bichloride or other reliable antiseptic solution (i. e., they should be put through the regular process of surgical disinfection) or boiled rubber gloves may be slipped on.

2. Sterilize the Instruments. This may be accomplished by soaking them in pure carbolic acid (95%) for ten minutes or in a 10% carbolic solution for thirty minutes. A safer plan is to boil them for five or ten minutes.

For boiling the instruments, a 1% solution of sodium carbonate (washing soda) is preferable to plain water. It dissolves the resisting capsule of bacteria and destroys them more quickly (in five minutes boiling) and also tends to diminish rusting of instruments. Any kind of a pan, set on a stove or over an alcohol lamp or gas flame, will do for an instrument boiler. The ordinary fish-boiler of granite-iron makes a very good instrument sterilizer. A satisfactory simple boiler for instruments is shown in Fig. 107. Nicer and more convenient instrument boilers may be purchased as desired. There are a number of satisfactory patterns. The one shown in Fig. 108 has the advantage that the dressings for a small operation may be sterilized at the same time with the instruments.

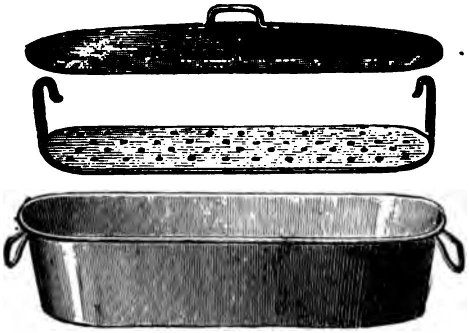


Fig. 107. A simple instrument boiler.

In office or clinic work when through examining a patient, wash the instruments and drop them into the boiler and in a few minutes they are sterilized, ready to use for another patient or to be put away. Edged instruments, such as knives and scissors are more or less dulled by the boiling. Consequently when there is plenty of time, it is better to sterilize them by soaking them in carbolic acid or other suitable antiseptic. When a knife is put in with other instruments for sterilization the cutting portion should be wrapped with cotton.

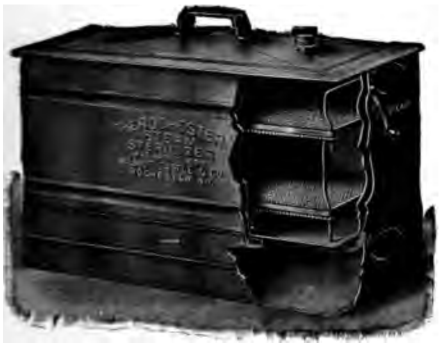


Fig. 108. A small instrument and dressing sterilizer. The dressings for a small operation may be sterilized in the trays above the boiling instruments.

The instrument tray also must of course be sterile. It is contaminated every time a soiled instrument is laid back in it and unless disinfected may carry disease from one patient to another. To obviate this, each instrument after use may be laid on a clean towel (if it is to be used again during that examination) or dropped in a basin for later cleansing. Again, a light shallow pan may be used as an instrument boiler and instrument tray combined, the instruments being boiled in it each time before use. This gives, in a few minutes, sterile instruments in a sterile container.

3. Do not touch the intrauterine part of any instrument. This rule should be very carefully observed, for in it lies one of the secrets of avoiding infection of the uterine cavity in office examination and treatment.

The hands may have been well disinfected or they may have been covered with

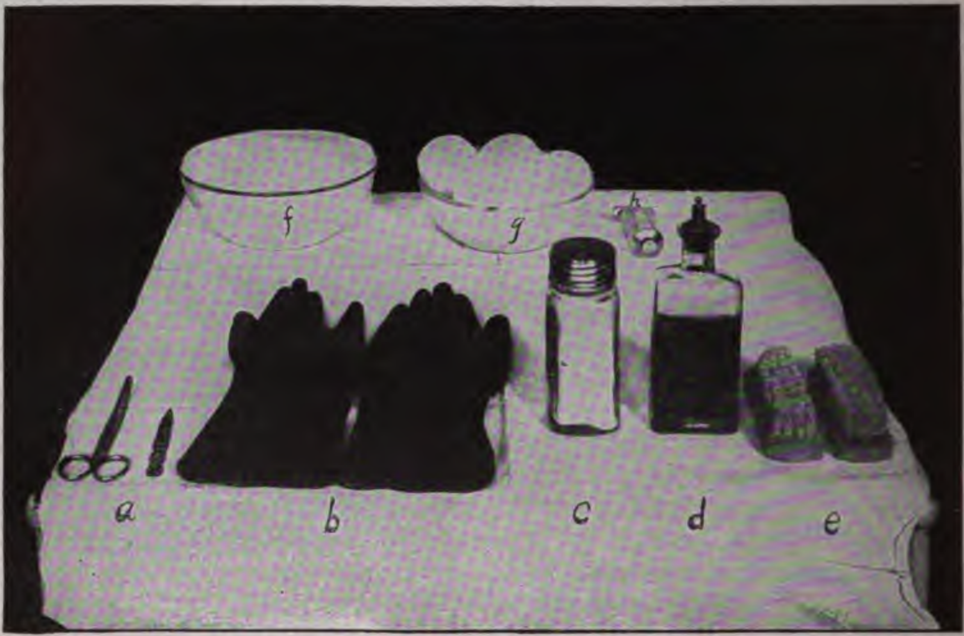


Fig. 109. The articles needed for preparing for the gynecological examination, arranged conveniently on a stand. a. Finger-nail instruments. b. Rubber gloves. c. Powder for dusting in rubber gloves, to make them slip on easily. d. Liquid soap in a drop-bottle. e. Hand brushes. f. Bichloride solution. g. Cotton balls. h. Lubricant in compressible tube.

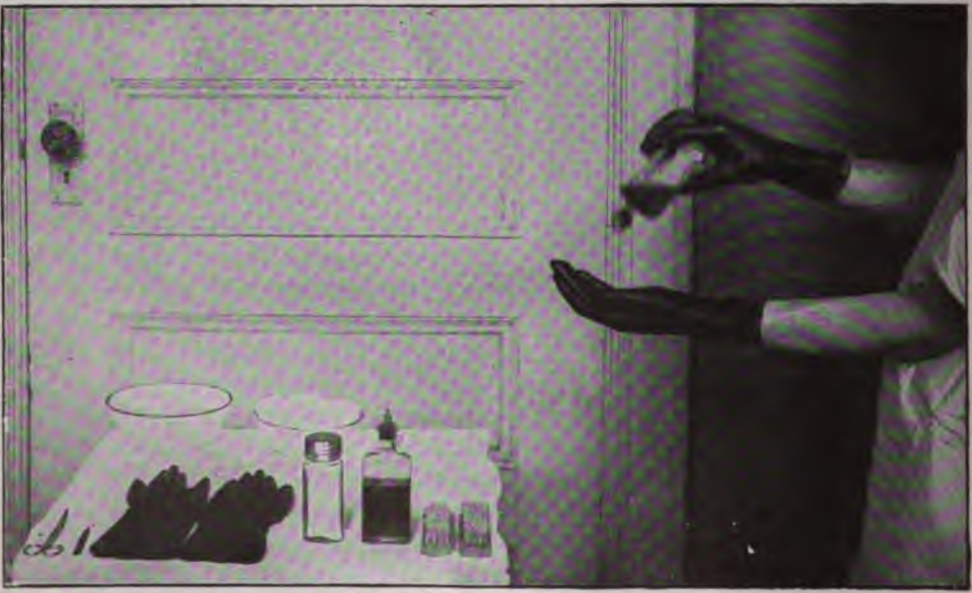


Fig. 110. Method of using the drop-bottle containing liquid soap.

boiled rubber gloves, giving a perfectly sterile covering, but in office work the field of examination has not been disinfected. The hands necessarily touch undisinfected surfaces and hence do not remain sterile. Consequently, when handling an instrument for intrauterine work, it is important, even when wearing rubber gloves, to observe the rule not to touch that part of the instrument that is to enter the cervical canal. When bending the end of the uterine sound, dip a large piece of absorbent cotton in a reliable antiseptic solution and grasp the part to be moulded with that. If the uterine canal is to be cleansed with a cotton-wrapped applicator, use one of those previously prepared, as described under intra-uterine treatment in chapter III. If one must be prepared for immediate use, be sure to cleanse carefully the fingers that touch the cotton and also, before introducing the cotton, dip it in an antiseptic solution.

The other antiseptic precautions necessary in intrauterine exploration and treatment have already been given.

SOAP, BRUSHES, LUBRICANT.

Soap. Use some liquid preparation of green soap. The free use of such a soap is the most important step in hand disinfection. A number of excellent and convenient preparations of liquid soap have been put on the market by various firms, in drop bottles (Fig. 109-d) from which the soap may be dropped as needed without waste. Such a bottle may be filled with ordinary tincture of green soap (tincture sapo viridis) or any other required preparation, purchased in quantity or made up as desired. Fig. 110 shows the use of the drop bottle. A still more convenient arrangement is the stationary holder for liquid soap, fastened just above the washstand. Fig. 111 shows a good pattern. Slight upward pressure against the projecting stem at the bottom causes the liquid soap to flow into the hand.

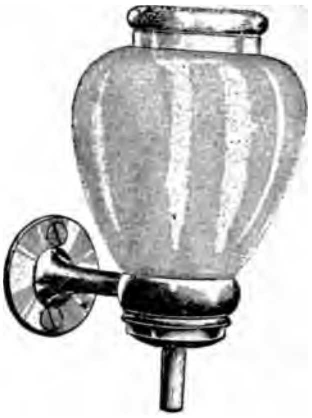


Fig. 111. A convenient wall-fixture for liquid soap. Slight upward pressure on the metal stem at the bottom causes the soap to flow into the open hand.

Some liquid preparation should be used entirely for soap. The ordinary cake soap is not effective for surgical cleansing.

Brushes. For cleansing the irregularities about the fingers, a brush is necessary. The ordinary small hand-brush of vegetable fiber with a plain back (Fig. 109-e), does very well. Such brushes are cheap and will stand boiling and are effective as long as the fiber portion is uniformly stiff. When a brush becomes too soft from repeated boiling, it should be thrown away or laid aside to be used on surfaces where a softer brush is required, such as the abdominal surface or genitals of patient being prepared for operation.

A brush used in scrubbing the hands after examining an infected or doubtful case, must be boiled before being used again. It is convenient to have several brushes boiled and kept in a jar ready for use. They may be kept dry or in an antiseptic solution.

Lubricant. A drop or two of liquid soap on the wet fingers or glove makes a most satisfactory lubricant. The smallest quantity lubricates thoroughly and is in a measure antiseptic and is easily removed. Glycerine I do not find satisfactory. Unless used in such large quantity as to be inconvenient, it does not lubricate well.

In the absence of liquid soap, any clean unirritating ointment will do. When an ointment is used, it is well to have it put up in a compressible tube (Fig. 109-h), for then the unused part is kept sterile.

USE OF RUBBER GLOVES.

I wish to call attention to the routine use of rubber gloves in examination and office treatment, particularly in cases where any infection is present or suspected.

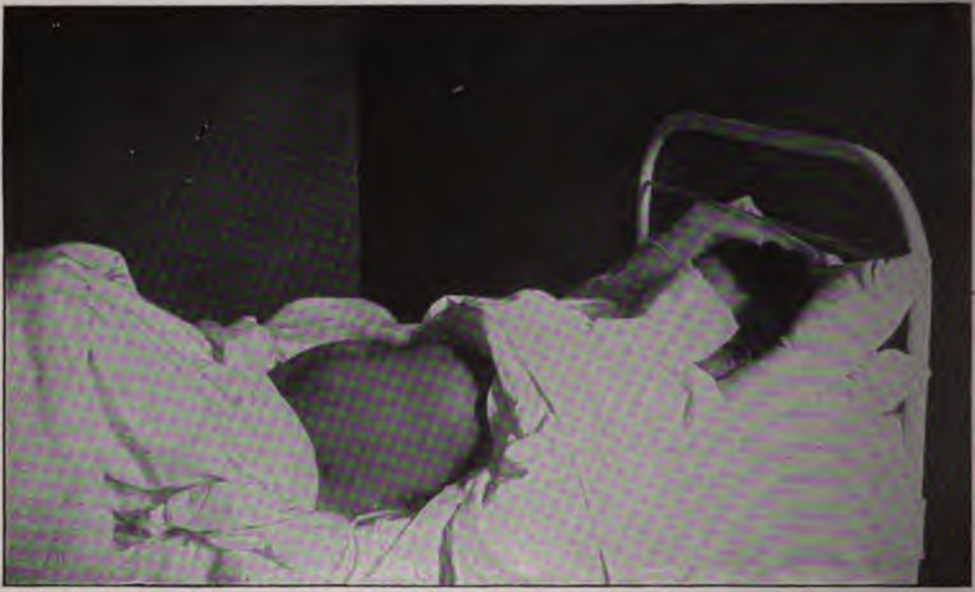


Fig. 112. Patient arranged for abdominal examination in bed.

For ordinary office work, it is convenient to **put them on dry.** When a small amount of boric acid powder or talcum powder is dusted into each glove, it slips on easily. The glove-covered hands are then put through the regular washing with liquid soap and water. After the examination, the gloves are slipped off and thrown into a basin for subsequent boiling. Thus the infective material is kept away from the washstand as well as from the hands. After the office work is finished, water is poured into the basin of soiled gloves and they are boiled for ten minutes. It is well to have a towel in the basin to protect the gloves from injury by direct contact with the hot metal bottom and sides. After the sterilization, the gloves are taken out, cleansed in water to remove all foreign particles adhering to them, dried on a clean towel (being turned inside out often enough to secure good drying), dusted inside and out with a drying powder, wrapped in a clean towel, and laid away for subsequent use. When there is an examination or treatment requiring sterile hands, a pair of the rubber gloves is wrapped in a small towel and dropped into the water on top of the instruments, to be **boiled** with them. When putting on the boiled gloves fill them with sterile water to make them slip on easier. When no cool sterile water is at hand for distending the glove, a drop of liquid soap rubbed over the hand will enable the glove to slip on easily. In putting on a sterile glove, do not touch the fingers of the glove with the other hand. When it is necessary to push the glove on a finger, use a portion of the towel in which the gloves were boiled.

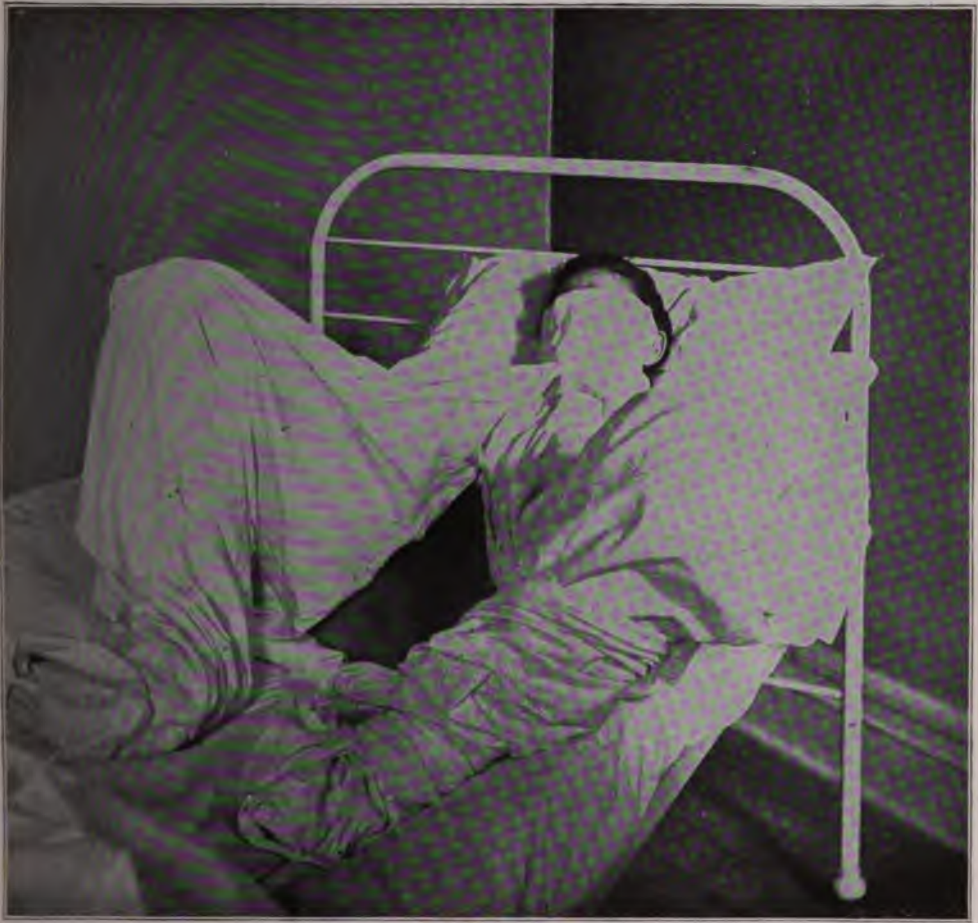


Fig. 113. Patient arranged for vaginal examination in bed. In this and the two succeeding photographs, the sheet has been pushed aside to show the necessary relations. As a rule the examination can be conducted under the sheet without any exposure of the gentials.

Two or three pairs of rubber gloves, kept ready for use, constitute one of the best investments the practitioner can make, for the following reasons:

1. They protect the hands from syphilitic or other infection through some unnoticed crack or abrasion.

2. They prevent disagreeable odors clinging to the hands, as otherwise happens in vaginal examination in cases of advanced uterine cancer and in all rectal examinations.

3. They do away with the severe scrubbing of the fingers and hands, which is otherwise necessary after each examination or treatment of a patient with any form of infection. This frequent severe scrubbing keeps the skin rough and in bad condition.

4. Boiling the gloves after use, eliminates all danger of carrying contamination from one patient to another and keeps the infective material away from the washstand and other office fixtures.

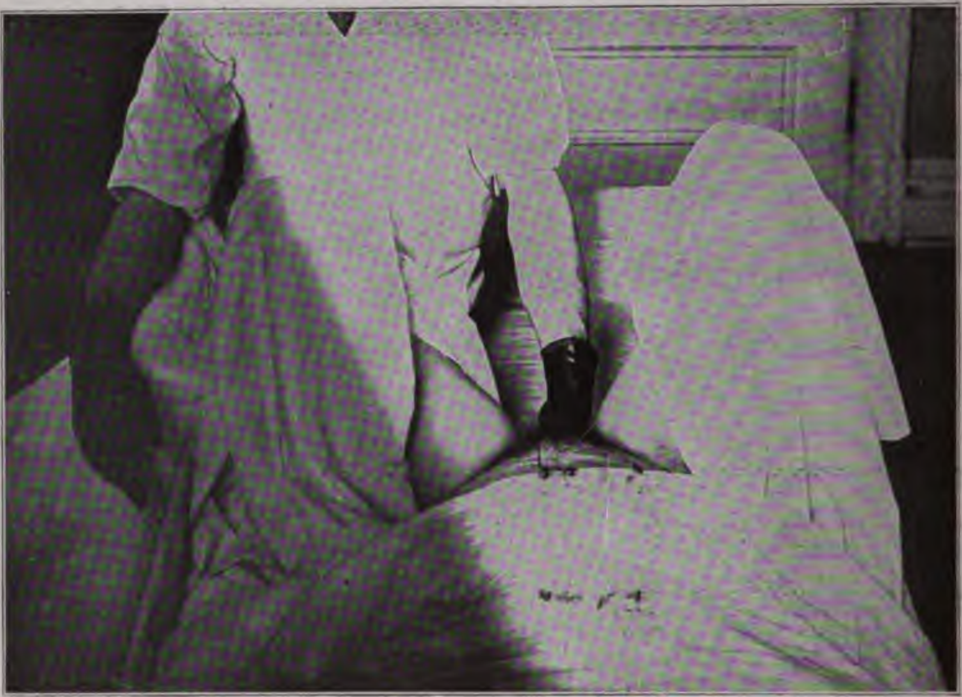


Fig. 114. Deep bimanual examination with the patient in bed. Showing the relations of the examining hand and arm. The examiner sits on the side of the bed and the arm lies *between* the widely-separated thighs, so that the examination is made from directly in front of the pelvis.

5. When an absolutely sterile covering for the hands is desired, it is easily secured by boiling the gloves immediately before use.

AVOID UNNECESSARY EXPOSURE.

In all the steps of the examination and in all examinations and treatments, avoid exposing the patient any more than is necessary. Do not let your study of the clinical and scientific features of the case so preoccupy your mind that you neglect this.

The carelessness manifested in this respect by some physicians is extremely reprehensible. This careless disregard of the natural modesty of the patient is seen both in private work and in clinic work but especially in the latter, where it is just as reprehensible as in the former. To the physician studying the difficult features of a case in an endeavor to save the patient's life or restore her to health, this may seem a small matter—but nevertheless it is an important one and should be thought of. Furthermore, the poor patient, who in the clinic puts herself under the care of the teacher and his assistants, is just as much entitled to thoughtful consideration in this matter as the woman in better financial circumstances who comes as a private patient.

PRESERVATION OF SPECIMENS.

The preservation of specimens for microscopic examination is a very simple proceedure and yet in many doubtful cases, curettings or cervical polypi removed or pieces of tissue passed spontaneously, are thrown away or kept in such a manner that they are not fit for microscopic examination. Thus is lost a valuable aid to early diagnosis, in conditions where early diagnosis is important.

A good all-around preservative for these specimens is alcohol (95%). It is nearly always at hand and it preserves the specimen indefinitely in good condition for microscopic examination. As soon as possible after removal and without unnecessary handling, the specimen is dropped into a small bottle containing the preservative and then forwarded to the pathologist.

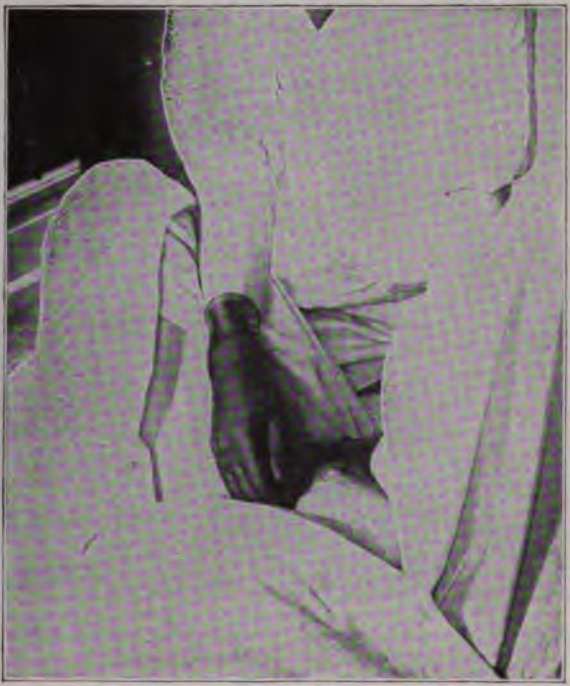


Fig. 115. Deep bimanual palpation with the patient in bed, showing the abdominal arm *between* the thighs. The other arm is partially hidden by the sheet.

A 10% solution of formol is another good preservative. Formol, which is a 40% solution of formaldehyde gas, is known also as formalin and as formaldehyde solution.

For particular points in the saving and transmission of curettings for diagnostic purposes, see previous pages (curetment under anesthesia).

EXAMINATION ON BED.

When a patient is seen at her home, sick in bed, the methods of exploration employed are usually abdominal, vaginal, vagino-abdominal and, in some cases, recto-abdominal. A patient who is too sick to come to the office for a pelvic examination, is usually suffering, not with a superficial disturbance that can be seen by inspection of the external genitals or through a speculum, but with some deep-seated trouble, the nature of which can be determined only by deep internal palpation. In such a case, the inspection of the genitals and the speculum examination add nothing of importance to the information otherwise obtained, and as they are particularly disagreeable to the patient they may be dispensed with.

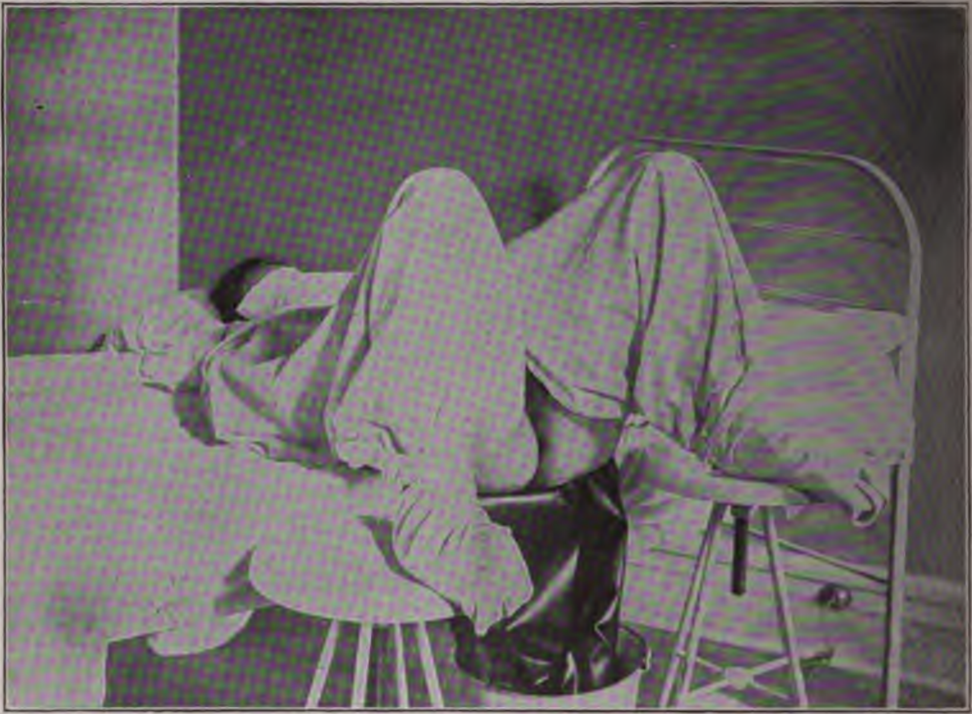


Fig. 116. Regular "cross-bed" position. The patient is turned directly across the bed, with the hips resting on the edge of the bed and each foot on a chair.

In such a case, the abdominal examination is first made. The patient is directed to move to the edge of the bed and the clothing is loosened and pushed up and down, to expose the abdomen, and the knees are drawn up to relax the abdominal muscles (Fig. 112). The abdomen is then examined by the various methods previously explained.

The vaginal and vagino-abdominal examinations, with deep bimanual palpation, may be conveniently and satisfactorily conducted with but little disturbance to the patient by observing the following directions, some of which were partially carried out in arranging for the abdominal examination:

1. Direct the patient to move close to the left edge of the bed. There is but little disturbance — she lies just as she is in the bed, except nearer the left edge (or the right edge, if the examiner uses the right hand for the internal palpation). A patient seriously sick, even with peritonitis, may usually be moved over sufficiently without much pain.

2. Remove the heavy bed-clothing, all except the sheet with perhaps a light blanket, and have the patient draw up both knees so that the feet are near the buttocks (Fig. 113).

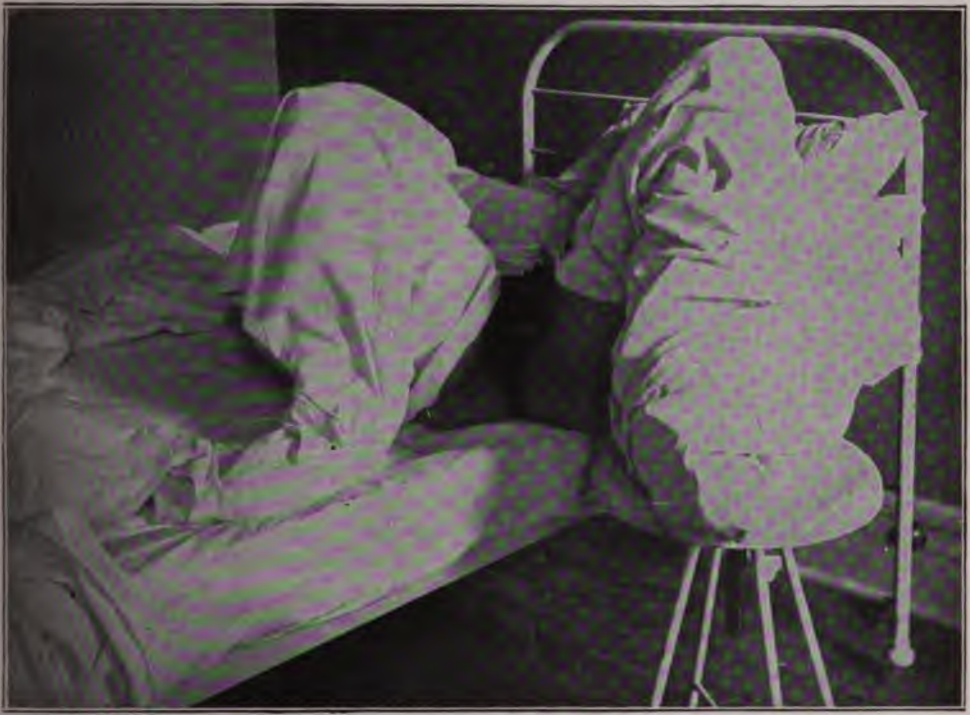


Fig. 117. Another method of arranging a bed-patient for examination of external genitals. This is useful when the patient is very sick or when movement is painful. The hips are simply slipped to the edge of the bed and one foot placed on a chair.

3. Sit on the bed, or on a chair placed at the side of the bed, against the patient's left foot and direct the patient to separate the knees widely. The sheet is then raised sufficiently to permit the examining hand (with the index and middle fingers well lubricated) to be passed **between** the patient's thighs (Fig. 114)—not under one thigh, as ordinarily directed. The hand is carried to the perineum and the examining fingers are introduced deeply into the vagina, taking care to depress the perineum sufficiently to allow their introduction without pain.

4. After the simple vaginal examination is completed, then the right hand, passed under the sheet, is made to depress the abdominal wall into the pelvis as in the regular bimanual examination (Fig. 115). In Figs. 113 and 114 and 115,

the sheet has been pushed aside in order to show the necessary relations. Ordinarily the entire examination may be conducted under the sheet and without exposing the patient in the least.

I call special attention to the details given above because I find that their accurate carrying out aids materially in securing needed information in deep-seated pelvic troubles. By following the directions closely, the examining hands and arms are made to occupy practically the same advantageous relation to the pelvis as in the regular office examination with the patient at the end of the table—that is, the examination is made from **directly in front** of the pelvis. The usual procedure of sitting on a chair beside the bed, with the examining arm passed under the thigh (instead of between the thighs) is much less effective when deep pelvic palpation is required.

While the examination steps above mentioned are generally the only ones required when the patient is sick in bed, there are some cases in which further examination is advisable. Whenever the patient complains of sores about the genitals or of itching or burning or profuse discharge, the genitals should be inspected in a good light. Likewise in any case in which it is thought that additional information of value may be obtained by the speculum examination, that procedure should be carried out.

For the inspection of the external genitals and for the speculum examination, the patient may be turned across the bed with the hips near the edge and each foot resting on a chair (Fig. 116). This is often referred to as the "cross-bed" position. If movement of the patient to this extent is likely to cause pain, she may be simply turned slightly and one foot placed on a chair while the other foot rests on the bed, as shown in Fig. 117.

NON-GYNECOLOGIC EXAMINATION METHODS

IN GYNECOLOGICAL CASES.

The physician must consider the **whole patient.** His work is to ascertain what is troubling the patient—in whatever part of the body the disease may be located or whatever organ or organs may be affected. It is not enough to find one well-marked disease. All the important troubles present, both organic and functional, should be found, for then only is the physician in a position to judge accurately as to how far each disease is responsible for the patient's disability and what the line of treatment should include and what the result will probably be.

To do this the physician must employ, in gynecological cases, various methods of examination which belong to other departments of medicine, and the detailed consideration of which would be out of place here. I will simply call attention here to the classes of patients with pelvic symptoms in which such extra-gynecologic examinations are especially required in the course of diagnosis or treatment. The examination methods to which I wish to call attention are, aside from the usual physical examination of the chest, as follows:

Examination of Urine.
Blood Examination.
Sputum Examination.
Examination of the Nervous System.

EXAMINATION OF URINE IN GYNECOLOGICAL CASES.

The examination of the urine gives important information as to the metabolism of the body and as to the condition of the most important excretory organs. In the following cases it is especially important that the urine be examined.

1. When the patient is **seriously sick** from any cause. In such a patient it is important to know the state of the body metabolism and excretion.

2. When there are **bladder** or **kidney** or **ureteral symptoms.** Do not treat the patient for weeks or months for frequent painful urination or pains in the kidney region, without examining the urine to see whether or not there is a local lesion. And when there is trouble in the urinary tract, make frequent examinations that you may keep posted as to the improvement.

3. When the patient is to undergo **anesthesia,** either for operation or examination. The discovery of diabetes mellitus or chronic interstitial nephritis is made with much more satisfaction to yourself and much better prognosis to the patient before anesthesia than afterward, when the patient may be in diabetic coma or urameic convulsions. Again, in the milder cases, it is not pleasant to be obliged to date the patient's persistent nephritis from your operation or anesthesia, when in all probability it was there before, but you have no proof of it. Again, a knowledge of the patient's kidney function may cause you to postpone the operation or anesthesia for a time, until the temporary disability is overcome.

4. In **doubtful cases**—cases in which the cause of the patient's local symptoms or general debility is not clear. You wonder why the patient does not pick up and improve more rapidly under your excellent treatment. You are annoyed by the patient's reiterated complaint of the bladder irritability or the loin-pain or the headaches that come without reason or the digestive disturbances that persist without good and sufficient cause.

There is a hidden cause. It may be in the urinary tract. It may, on the other hand, be in the digestive tract or in the blood or in the nervous system or in the lungs. Find it.

BLOOD EXAMINATION IN GYNECOLOGICAL CASES.

The points in blood examination which are helpful in certain patients with gynecological symptoms are the hemoglobin percentage, the red-cell count, leucocytosis, poikilocytosis and certain special conditions (Widal reaction, malaria plasmodium, pyogenic bacteria or other bacteria in the blood).

The classes of cases or conditions in which definite information on one or more of these points may be of material assistance are as follows:

Marked Anemia.
Acute Conditions of Doubtful Character.
Inflammation of Uncertain Progress.
Inflammation with Uncertain Resistance.

Blood Examination in Marked Anemia.

In gynecological patients with marked anemia, there are three conditions in which a blood examination is especially useful:

1. **When the cause of the anemia is not clear.** You may be mistaken in your idea that the persistent anemia and increasing weakness is due to the chronic pelvic disease. Possibly the patient has one of the various forms of pernicious anemia. An examination of a stained specimen of the blood will tell at once.

I remember a patient whose anemia was supposed to be due to an associated chronic malaria and she was treated for that many months, until her condition became desperate. When I saw her, there were some pelvic symptoms but not sufficient to account for the deterioration of general health. Being at a loss to account for the anemia and weakness, and finding nothing of special importance in the urine, I took specimens of the blood. Examination of these made the case clear at once. There was an advanced leukaemia, of which the patient died within a few months. The pelvic disturbance had nothing to do with the serious symptoms.

In a doubtful case, if not prepared to make the blood examinations yourself, make some cover-glass spread preparations of the blood, pack them securely in a pill-box or other suitable container and mail them to a pathologist, with a brief statement of the history of the case.

2. **When anesthesia or an operation is required.** In a patient markedly anemic, anesthesia is a serious matter even though it is only for a small operation or simply for examination.

All the organs are below par and some condition that would be a trivial matter at other times might lead to a fatal termination. A red-cell count or a hemoglobin estimate will give definite information as to the oxygen carrying power of the blood. If the hemoglobin is below 30%, the operation or anesthesia should be postponed if possible until the patient has been put in a better condition, by the administration of iron and such other tonics as are indicated.

3. **When trying to overcome serious anemia.** In such a case a hemoglobin estimate or blood count at regular intervals will show definitely the effect of the treatment.

Blood Examination in Acute Conditions of Doubtful Character.

There are several conditions arising in patients with pelvic symptoms in which the ascertaining of one or another fact concerning the blood is a decided help in determining the cause of the patient's serious illness.

1. **Fever.** The patient has persistent fever and pelvic disturbance, but the cause

is not altogether clear. Is the fever due to uterine or pelvic inflammation from puerperal or non-puerperal infection, or is it due to typhoid fever or malaria?

Malaria may usually be easily excluded by the administration of quinine, but not always. Examination of the blood, taken at the proper time, will show almost certainly whether the trouble is typhoid fever (Widal reaction, no leucocytosis) or malaria (plasmodium, no leucocytosis) or something else.

I recall two cases in particular in which I felt that decided help was given by the blood examination. I was called to see a patient who had had a miscarriage several days before and during the past two days there had been considerable fever. The temperature (forenoon) was 101°. Pelvic examination showed no decided pathological condition. The local conditions seemed about as they should be at that time after a miscarriage. When I saw her that night the temperature had gone to 103°, but was subsiding. There was evidently serious trouble and I made arrangements to clear out the uterus the next morning. That night when thinking over the case, for I was somewhat puzzled by it, it occurred to me that it might be typhoid fever, though no particular evidence of this had been noticed in the examination, except a persistent headache out of proportion to the fever. The next morning the temperature was again lowerand I felt safe in waiting for the report of the blood examination before disturbing the uterus. A good Widal reaction was found and the subsequent course of the disease showed it to be typhoid fever, from which the patient recovered without any uterine disturbance. Particular inquiry revealed the fact that the patient had been feeling "under the weather" for some days before the miscarriage. Possibly the miscarriage was due to the beginning typhoid fever, though of that I am not certain.

In the other case referred to, I was called in consultation to see a young woman who for two or three days had had fever,running up to 103° and 104° in the afternoon but lower in the morning. The patient had had a miscarriage a week before and examination showed a subacute gonorrhoea. There was considerable discharge and gonococci in abundance but no decided evidence of a septic metritis or of a periuterine inflammatory focus. Because of the regularity of the fever and the absence of the evidences of a local lesion sufficient to account for it, I suspected typhoid fever. Blood examination showed no Widal reaction, neither was there a marked leucocytosis. A second blood examination gave the same result except that there was more leucocytosis. Typhoid fever was thus excluded. I then sent the patient to the hospital on account of the pelvic trouble and in a short time there developed unmistakable signs of a focus of pelvic suppuration, which I drained per vaginam with satisfactory result. The pus from the abscess showed a mixed infection, but principally gonococci.

2. **Pain.** There is severe persistent pain in the pelvis and marked tenderness, **without much fever.** Is the pain due to severe pelvic neuralgia, or other functional nervous disturbance, or to bleeding from tubal pregnancy. Ordinarily the differential diagnosis is easily made by the symptoms and physical signs. But when the blood in the peritoneal cavity is fluid (no induration) and not of sufficient quantity to seriously affect the pulse, the pain and tenderness (preventing satisfactory pelvic examination) are about the only signs present. If decided hemorrhage is present, a leucocytosis may be found.

When the pain is associated **with fever**, a marked leucocytosis (principally polynuclear) points to some acute inflammatory trouble, such as salpingitis or appendicitis.

In uncomplicated pelvic tuberculosis or tubercular peritonitis there is no leucocytosis.

In certain post-operative conditions leucocytosis may be of assistance in connection with the other symptoms. The patient has abdominal pains and there is marked distention of the abdomen and vomiting and persistent failure to secure a bowel movement. Is it gaseous distension of a sluggish bowel or intestinal obstruction? It is said that the latter condition nearly always gives a leucocytosis of 20,000 within the first 24 hours, while in simple distension the leucocyte count is but little above normal. If this observation proves generally true, it will be a most valuable help in the early differential diagnosis in these very trying cases.

Blood Examination in Inflammation to Determine if it is Spreading.

Here the point is to determine the presence or absence of marked pathological leucocytosis, and the important thing is not so much the absolute increase of leucocytes as the **relative increase** of **polynuclear** leucocytes. In physiological leucocytosis, which takes place under many ordinary normal conditions (after a meal, after a cold bath, after exercise, during pregnancy, in the puerperium, during menstruation), the relative proportion of 60% to 75% polynuclears is preserved. In the ordinary pathological leucocytosis the proportion of polynuclear leucocytes runs higher, particularly in the presence of pus.

As a general proposition it may be said that polynuclear leucocytosis is present wherever there is acute resistance to the spread of inflammation or irritation. It is present then in practically all ordinary inflammatory lesions, except when the acute symptoms have subsided and the absorption has ceased (focus is well walled off) or where the inflammation is so very virulent that the body resistance is overwhelmed and there is little reaction. It is absent in uncomplicated typhoid fever, malaria, tuberculosis, influenza and measles.

In the following cases the blood examination may help some in determining whether the inflammation is seriously spreading.

1. **Acute salpingitis (non-puerperal).** The patient is in the midst of a primary attack of salpingitis with accompanying pelvic peritonitis, or there is an acute exacerbation of an old salpingitis. The fever is running moderately high and there is much pain. Is it safe to wait for the interval operation to remove the diseased structure or should the operation be carried out now in the presence of this fresh virulent infection? If the inflammation is subsiding, the former plan is the better. If the inflammation is spreading and threatening a general peritonitis, the latter plan is the better.

In all but exceptional cases, the ordinary symptoms and examination findings, if carefully worked out and considered, will place the patient decidedly in one class of the other and with far more certainty than will a blood test. In some doubtful cases, however, repeated examination of the blood at short intervals, to determine whether the leucocytosis is rising or falling, will aid materially in deciding the question.

2. **Puerperal sepsis.** Here also the ordinary examination methods furnish the most reliable information concerning the local and general condition, and they must not be neglected or slighted in the false hope that laboratory tests will supply the desired knowledge.

But in cases that are still doubtful, in spite of careful analysis of the symptoms and examination findings, considerable help may in some instances be obtained by repeated examinations of the blood at short intervals to determine whether the leucocytosis is rising or falling, and to determine also the number and character of the bacteria in the blood at different times. The exact determination of these two facts may give substantial aid, in exceptional cases, in directing treatment and in prognosis.

Blood Examination in Inflammation to Determine the Vital Resistance.

Pathological leucocytosis means resistance. A slight inflammation awakens a slight resistance (slight leucocytosis). A severe inflammation awakens a strong resistance (marked leucocytosis), if the patient has the required vital force. There are exceptional cases in which the infection is so very virulent that the vital forces are overwhelmed and offer but little resistance, but these cases are comparatively infrequent. In ordinary acute inflammation of severe grade, a good leucocytosis means good body resistance and reserve force, and a poor leucocytosis means poor body resistance. This is the case particularly with inflammation of the serous membranes, including the peritoneum.

This fact may be turned to account in cases of advanced general peritonitis that are not seen until late and where it is a question whether an operation could possibly do any good. A marked leucocytosis means that there is still decided vital resistance and there is a chance of recovery if nature is judiciously aided in the fight.

The absence of well marked leucocytosis, in the presence of this severe and active inflammation, means that the patient's reserve force is exhausted, and operation would probably have no effect except to hasten death. In attaching importance to leucocytosis in a patient in this desperate condition, be careful that you be not misled by the leucocytosis that comes "in articulo mortis.'

SPUTUM EXAMINATION IN GYNECOLOGICAL CASES.

The two points of importance are the presence or absence of tubercle bacilli and the presence of elastic fibers, indicating destruction of lung tissue.

The gynecological cases in which sputum examination is required are those presenting the following conditions:

1. **Suspected Pelvic Tuberculosis.** Pelvic tuberculosis is nearly always secondary to a tubercular focus elsewhere in the body, and the most frequent sites of the primary focus are the lungs and the intestinal tract. The patient may not acknowledge that she has a cough, it is so slight. But the direction to save, in the

bottle that is given her, all the mucus that can be gotten up in the morning, will usually bring sufficient for examination, if there is any trouble there.

2. **Unwarranted Emaciation and Debility.** The patient has some pelvic disturbance but not enough to cause the poor general health. What does cause it? Possibly it is from beginning pulmonary tuberculosis. Determine whether or not such is the case.

EXAMINATION OF THE NERVOUS SYSTEM IN GYNECOLOGICAL CASES.

That portion of the nervous system distributed to the pelvis furnishes its quota of local painful disturbances (neuralgia, neuritis, transferred pains) and local paralyses, which must be taken into consideration in the diagnosis and treatment of pelvic diseases.

There are, in addition, certain general diseases of the nervous system which cause complaint of pelvic symptoms and occasion much confusion in diagnosis. They are principally four, as follows:

Hysteria,
Neurasthenia,
Hypochondria,
Melancholia.

The recognition of these diseases depends of course on a knowledge of the clinical manifestations of each disease and a careful consideration of the symptoms presented by the patient. This differential diagnosis cannot be taken up here. My purpose is simply to call attention to **certain classes of patients** with pelvic symptoms in which this special investigation of the nervous system should be carried out. They are as follows:

1. **Very nervous patients.** I use the term "nervous" in the ordinary commonly-accepted meaning of the word. The patient is perturbed more than one would expect under the circumstances. She may be simply frightened or embarrassed or, on the other hand, she may have some decided organic disease of the brain or nervous system, or some functional nervous disturbance.

The patient may have a well marked pelvic lesion, but that does not cause the evidences of an unstable nervous system. What does?

This particular consideration of the nervous system need not necessarily be made at the first visit. The patient may be observed for a time, and possibly it will be seen that the nervous manifestations largely disappear as acquaintance is established. As long as the nervous symptoms persist, however, they constitute an undetermined factor in the case, with a possible bearing on the patient's loss of health.

2. **Pelvic Distress without Corresponding Lesion.** The complaint of a gynecological affection for which no evidence can be found, not even tenderness, may be due to pronounced hypochondria.

The persistent manifestation by the patient of a fixed idea that she has some pelvic disease, which in fact is not present, may be due to beginning melancholia.

On the other hand such complaints may be due to a deliberate attempt on the part of the patient to deceive the physician—hoping thereby to secure an opinion that would be useful in a suit for damages or for divorce, or hoping that the physician may use some examination method or treatment that would lead to an abortion.

MISCELLANEOUS EXAMINATION METHODS.

There are a number of other examination methods which are occasionally useful in gynecologic cases, particularly the four below mentioned.

Serum Test for Pregnancy.

The serum test is useful in those cases in which the ordinary examination-signs are not conclusive for or against pregnancy. Also, in unmarried women where pregnancy is suspected and yet it is thought inadvisable to suggest a local examination, an examination of the blood, ostensibly on account of the poor health, may give positive evidence of pregnancy.

This test, brought out by Abderhalden in 1912, is based upon the fact that during pregnancy the blood contains a proteolytic ferment which causes cleavage of placental albumen. The test is complicated and requires laboratory apparatus and trained supervision. It is not necessary to describe here the various steps in the test. Anyone interested in the complicated details may find an interesting description of them, and a review of the literature, in a recent article by Schwarz (Interstate Med. Jour., Vol. XX, No. 3, 1913.)

When carried out under proper supervision and checks, the blood test shows certainly the presence or absence of the placental ferment. The reaction is present from the seventh week of pregnancy, continues during pregnancy, and disappears about two weeks after the termination of pregnancy, regardless of the time (period) of termination. A positive reaction means that the patient has placental tissue in the body or has had within two weeks past.

The placental tissue may be in the uterus or it may be in the tube or in some other extra-uterine situation. The fetus may be living or dead. On the other hand, there may be no fetus, only placental tissue. The reaction is given by hydatidiform mole, by chorio-epithelioma without recent pregnancy, and by any condition giving placental tissue with its resulting ferment.

If the above facts and limitations be kept in mind, the test may be used to advantage in a number of classes of cases.

Serum Test for Gonorrhoea.

The complement-fixation test is useful in identifying those gonorrhoeal cases in which the gonococcus cannot be demonstrated. This serum reaction begins about three weeks after infection and persists as long as there is an active focus of gonococci in the body. It becomes helpful, therefore, in that large class of subacute and chronic cases in which the gonococci have disappeared from the discharge. In these cases the diagnosis, heretofore, has had to rest on the history and certain incidental examination-findings. In a considerable proportion of these cases the history and examination signs are uncertain and a positive diagnosis of the character of the inflammation therefore impossible. These include cases of deep-seated pelvic inflammation and also of distant foci, such, for example, as inflammation of joints or of serous membranes (endocardium, pleura), in all of which a positive diagnosis is required as a guide to most effective treatment. The diagnosis in these doubtful cases may be cleared up with fair certainty by the complement-fixation test—provided the work is carried out by one well trained and with proper laboratory facilities and one familiar with the various pitfalls to be avoided in reaching conclusions.

The gonococci in different cases are not identical organisms, but may belong to different "strains" that react differently. Hence the antigen for the test must be prepared from many strains, and even then may possibly miss the strain present in the particular case to be tested. Again, the results are not dependable if the individual has had meningitis or has been vaccinated against meningitis.

There are a number of other tests such as the skin reaction, the injection of gonococcus vaccine, and the ophthalmic reaction, which may prove of value but they are still experimental and uncertain. In the last few years much work has been done towards developing these serum tests for gonorrhoea. Ar cellent resumé of the work to date, with its bearing on diagnosis and treatment, is given in a recent contribution by Abraham Sophian (Portner-Lewis Genito-Urinary Diagnosis and Therapy).

Tuberculin Test.

In cases of suspected pelvic tuberculosis, the tuberculin test may give material aid in reaching a positive decision. There are several methods of making the test. The tuberculin may be injected under the skin, constituting the subcutaneous tuberculin test of Koch. It may be worked into an abrasion of the skin, as in the cutaneous tuberculin test of Von Pirquet. It may be combined with an ointment and rubbed into the unbroken skin, as in the percutaneous tuberculin test of Moro. Also, any of the mucus surfaces may be used for the percutaneous reaction. A solution of tuberculin may be dropped into the eye, constituting the conjunctival test of Wolff-Eisner and Calmette. The subcutaneous test and the cutaneous test are the two most used. The percutaneous test is too uncertain and the conjunctival reaction is too dangerous to the eye.

Significance of the Reaction. When the test is carried out under proper precautions the reaction is specific—it is produced by tuberculosis anti-bodies only. It is essentially a test for the anti-bodies rather than for the tuberculosis itself. To be anti-bodies there must, of course, be a tuberculous focus, which produces the toxin that stimulates the cells to the production of anti-bodies. On the other hand, there may exceptionally be a tuberculous focus without the production of anti-bodies, or at least without the production of anti-bodies in sufficient quantity to give a characteristic reaction. This absence of anti-bodies may depend on the condition of the lesion itself (quiescent, thoroughly walled off) or upon some general condition of the patient which prohibits the usual antibody formation from the toxin irritation. In patients markedly cachetic, from advanced tuberculosis or other disease, the vital reaction is often so slow that anti-body formation is interfered with. The same result has been noted in many acute infectious diseases, including scarlet fever and measles.

In patient in fair physical condition and with no other acute disease, a negative reaction shows certainly the absence of tuberculosis (except a completely quiescent focus), while a positive reaction shows certainly the presence of tuberculosis. It must be kept in mind, however, that the test does not show the location of the tuberculous lesion. Simply because a patient with a suspicious lesion in the pelvis gives a good tuberculin reaction, it does not necessarily follow that the pelvic lesion is tuberculous. The tuberculous lesion may be in a lung or a kidney or in the intestinal tract or it may be a bone lesion, etc. Whether or not the focus giving the tuberculin reaction is in the suspicious pelvic lesion, must be determined by other evidence. Some very serious mistakes have been caused by overlooking this fact.

Subcutaneous Tuberculin Test (Koch). One to ten milligrams of tuberculin is injected subcutaneously, in one dose or in several doses at intervals of two or three days. In a healthy individual this produces no reaction. In an individual harboring tuberculosis anti-bodies it produces a decided reaction. The reaction is general, local and focal.

The general reaction is the one taken as characteristic of the subcutaneous test, and the most important feature of this is the rise in temperature, which appears in twelve to thirty-six hours and disappears in one to three days. The maximum temperature varies in different cases from 100 to 103, and is accompanied by corresponding subjective symptoms—aching, nervousness and general discomfort.

The local reaction consists of swelling and redness at the site of the injection—more than would be caused by ordinary bacterial contamination. The focal reaction consists of increased congestion about the tubercular focus. The disturbances from the focal congestion may be sufficient to aid some in identifying the location of the tubercular lesion.

Cutaneous Tuberculin Test (Von Pirquet). Tuberculin, diluted or undiluted as preferred, is worked into the superficial lymph spaces of a small area by a specially devised scarifier, which is furnished with the materials for the test. A control lesion is made with the same scarifier, thoroughly freed from tuberculin. Alcohol precipitates the tuberculin on the scarifier and hence should not be used—the thorough cleansing of the scarifier being made with water.

The reaction reaches its height usually in 24 hours, and if positive, indicates tuberculosis anti-bodies in the individual. Cachetic conditions and acute diseases interfere with this test the same as with the subcutaneous test. In suitable subjects, the cutaneous test has proven very reliable, and on account of the convenience and slight disturbance, it has largely displaced the injection test. An instructive work on the diagnostic and therapeutic use of tuberculin, is the recent volume by Pottenger (Tuberculin in Diagnosis and Treatment).

Wassermann Reaction.

This blood test for syphilis has proven exceedingly helpful in many doubtful cases, and has served to clear up the diagnosis in many cases presenting an obscure and baffling symptom-complex.

However, there has been a tendency in some quarters to place too much reliance upon the Wassermann reaction and its modifications. The diagnosis should not be based upon this test alone without other evidence, as there are other conditions that may give rise to this reaction.

CHAPTER II.

GYNECOLOGIC DIAGNOSIS.

The diagnosis in any case is based upon the symptoms given by the patient and the signs found on examination. It should, as far as possible, be both an anatomical and a pathological diagnosis—that is, it should state the location of the lesion and the character of the pathological process.

Method of Diagnosis.

Accurate diagnosis is much facilitated by a **grouping of diseases under certain prominent symptoms.** This is the natural method, the one that is followed unconsciously. The prominent sign or symptom in the case brings to mind a group of diseases, and then by the consideration of other ascertained facts, the diagnosis is narrowed down to one or two diseases. This differentiation should be made as one proceeds with the examination.

For example, suppose, during an examination, a sore (ulcer) is found on the external genitals. Immediately arises the question, "Is this a chancroidal ulcer or a syphilitic ulcer or a tubercular ulcer or a malignant ulcer or a simple ulcer?" Endeavor to settle the question then and there. Recall the facts in the history bearing on the differential diagnosis. Notice the characteristics of the lesion. Are there, in other parts of the body, evidences of syphilis or tuberculosis or malignant disease? Is there an irritating discharge, that could cause a simple ulcer?

Each important sign must be thus critically considered, and the habit of doing so should be assiduously cultivated. In a few cases the diagnosis is apparent from a few prominent facts, but in most cases, particularly in deep-seated and serious diseases, the diagnosis must be established by a **critical analysis** of the mass of information obtained in the history and examination. It is this critical analysis, this testing and elimination of diseases that do not stand the test, that makes the difference between the careful diagnosis and the snap diagnosis, between a real diagnosis and a guess, between a reliable diagnostician and an unreliable one.

This effective application of the signs to the diagnosis should, as far as practicable, be **made promptly and rapidly** as they are encountered in the examination. Though in a systematic history and examination, all the important facts are supposed to be obtained, yet if the application of the symptoms to the diagnosis is made as one proceeds, certain points of particular importance in the diagnosis in that case will be given the special attention which they require. Hence the importance of having mentally stored, and ready for immediate use, the diagnostic significance of the various facts brought out in the history and in the examination.

The following resume of the diagnostic significance of certain signs and symptoms is given, not as a complete collection of the diagnostic points in the various diseases, but simply as a working plan for the rapid differentiation of the more common gynecological affections and other conditions likely to be confounded with them. The rarer diseases and the less common diagnostic points and the conditions present in anomalous cases, may be found in the appropriate chapters.

POINTS IN THE ABDOMINAL EXAMINATION.

In this examination the abdomen is, as already explained, subjected to inspection, palpation, percussion, and, in exceptional cases, to auscultation and mensuration.

The principal points of diagnostic importance in connection with the abdominal examination are, in the order in which they are encountered in the examination, as follows:

Prominence of Abdomen,
Movement of Abdominal Wall,
Discoloration of Abdomen,
Tension of Abdomen,
Tenderness of Abdomen,
Mass in Abdomen,
Area of Dullness in Abdomen.

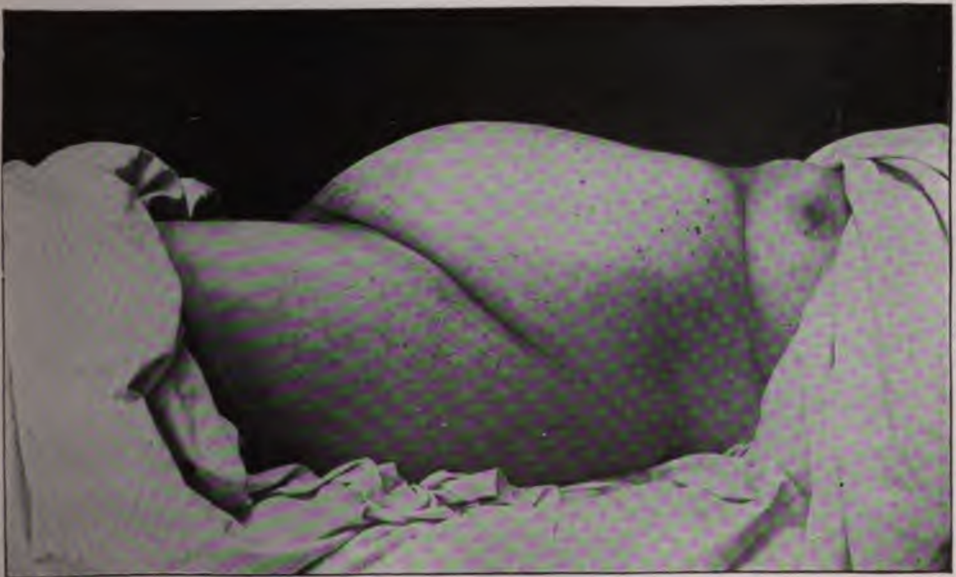


Fig. 118. Obesity. The most prominent feature in this case is the marked Obesity—see Fig. 121. There is also a fibroid tumor of the uterus and a small amount of ascitic fluid.

PROMINENCE OF THE ABDOMEN.

Decided prominence of the abdomen is due to many different affections, which may be conveniently arranged in five groups, as follows:

A. Some Affection of Abdominal Wall;
B. Something in Intestines;
C. Something in Peritoneal Cavity;
D. Some Enlarged Organ;
E. Tumor from Pelvis or Abdomen.

A. Abdominal Prominence from Some Affection of Wall.

Obesity (Fig. 118). There is evidence of fat deposit in other parts of the body. The abdominal wall may be picked up as a thick roll, and the fingers made to almost meet beneath (Figs. 119, 120), showing that most of the prominence is due to the thickness of the wall. There is no distinct localized mass, like a tumor in the wall.

Percussion gives resonance all over the abdomen. Sometimes a distinct "fat wave" may be obtained, but it may be distinguished from a " fluid wave" by the expedient shown in Fig. 36, and also by percussion. In some cases, when the patient stands, a distinct roll of fat drops below the general abdominal contour, as shown in Fig. 121.

Fig. 122 shows a case of obesity mistaken for ovarian tumor and sent to a hospital for operation. Fig. 123 shows a case of obesity which was mistaken for pregnancy.

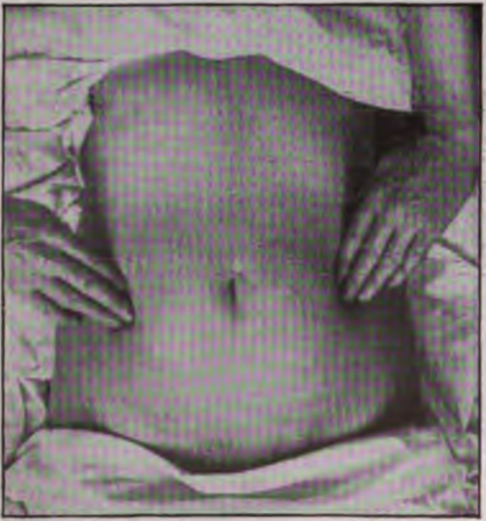


Fig. 119. Testing the thickness of the Abdominal Wall. First step.

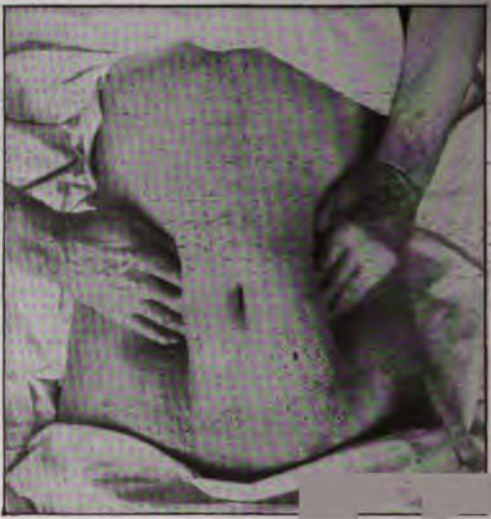
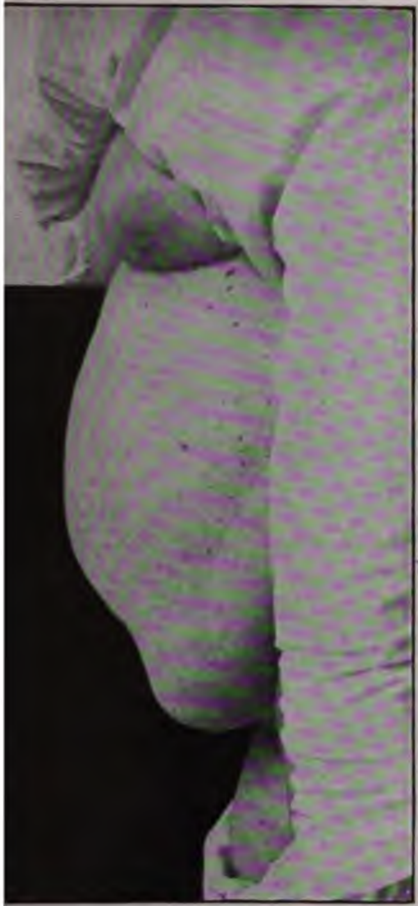


Fig. 120. Testing the thickness of the Abdominal Wall. Second step. The fingers carried beneath the wall.



. Obesity. Patient standing. Same patient
in Fig. 118. Notice the thick roll of subcu-
t that drops down below the general contour
omen.

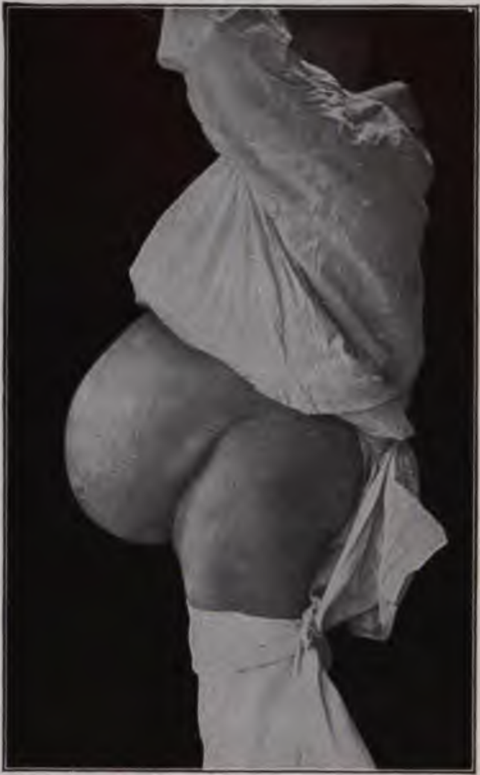


Fig. 122. Obesity, mistaken for ovarian tumor. This patient was sent to a hospital for operation for a supposed ovarian cyst. (Hirst — *Diseases of Women.*)

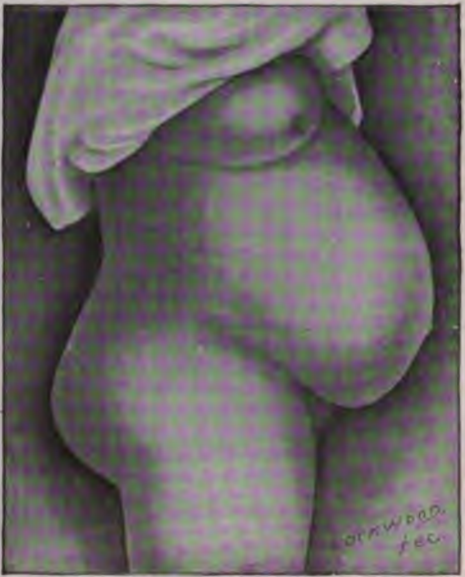


Fig. 123. Obesity, mistaken for pregnancy by patient. (Williams — *Obstetrics.*)

of Wall. There is a distinct mass,
uperficial and moves with the wall
parenty inseparably connected with
nass may be picked up and the
proximated beneath it. There is no
connection with any intra-abdominal
here is dullness on light percussion.
ance on deep percussion. Fig. 124
umor of the abdominal wall.

natory Mass in Wall. Same as
h evidences of inflammation added
enderness, fever and, in some cases,
d fluctuation.

ears ago I witnessed, as a visitor, an

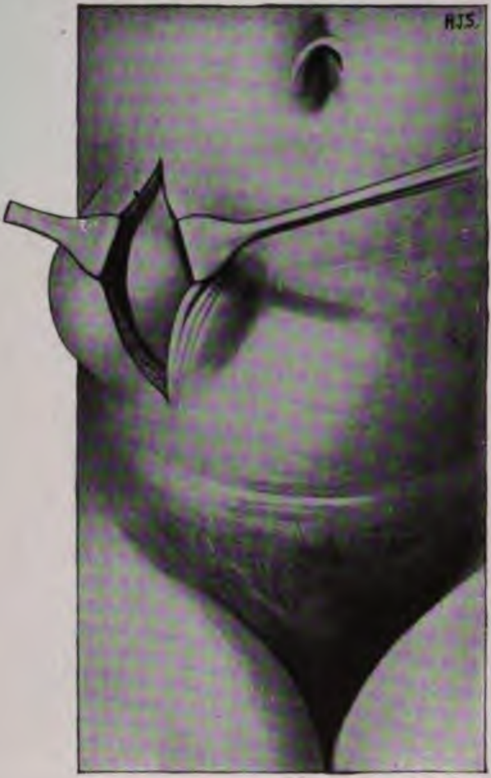


Fig. 124. A Tumor of the Abdominal Wall. (Montgomery — *Practical Gynecology*.)

operation upon a supposed strangulated ventral hernia. The patient gave a history of a long-standing swelling some distance to the left of the umbilicus. This suddenly enlarged and became painful, the enlargement being accompanied by abdominal pain, vomiting, constipation and evidences of inflammation in the mass. The patient was brought before a medical class for operation. As the hernial site was evidently infected, it was decided to open the abdomen elsewhere and deal with the intestine through the clean opening. Accordingly the peritoneal cavity was opened by a median incision. Exploration showed that the peritoneal surface of the abdominal wall on the affected side was perfectly normal. There was no hernia. The trouble was an abscess of the abdominal wall, probably resulting from the suppuration of a tumor. A large operative open-

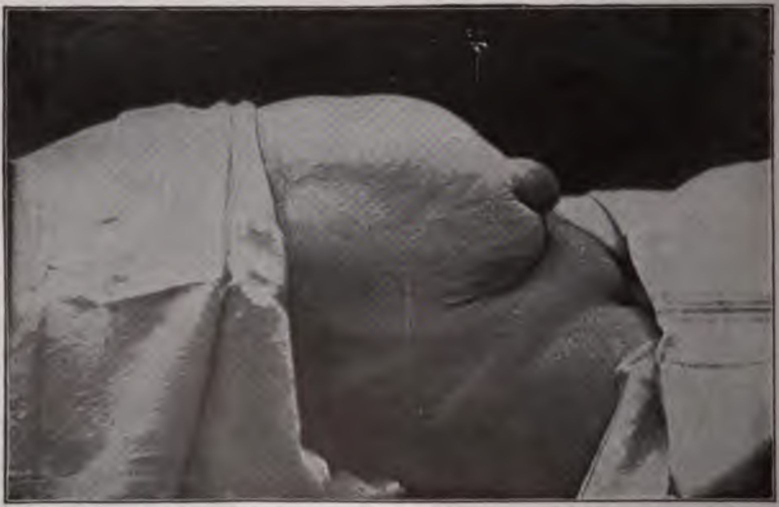


Fig. 125. A small Umbilical Hernia, with a relaxed abdominal wall. (Hirst — *Diseases of Women*.)

ing into the peritoneal cavity in such close proximity to an abscess, made a very uncomfortable state of affairs for the surgeon, particularly as the abscess was so

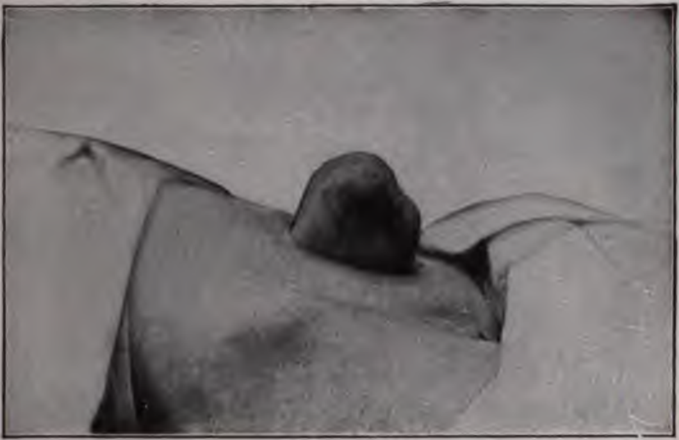


Fig. 126. A large Ventral Hernia at the site of an operation scar. (Hirst —*Diseases of Women.*)

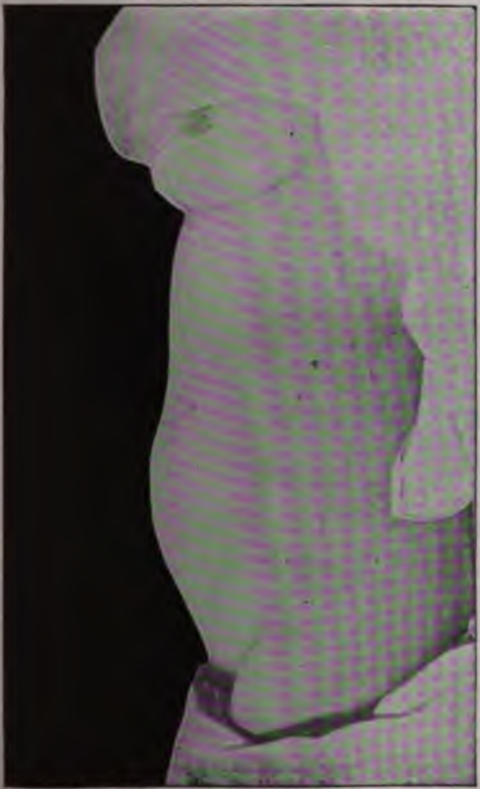


Fig. 127. The Contour of a Relaxed Abdominal Wall, with the patient Recumbent

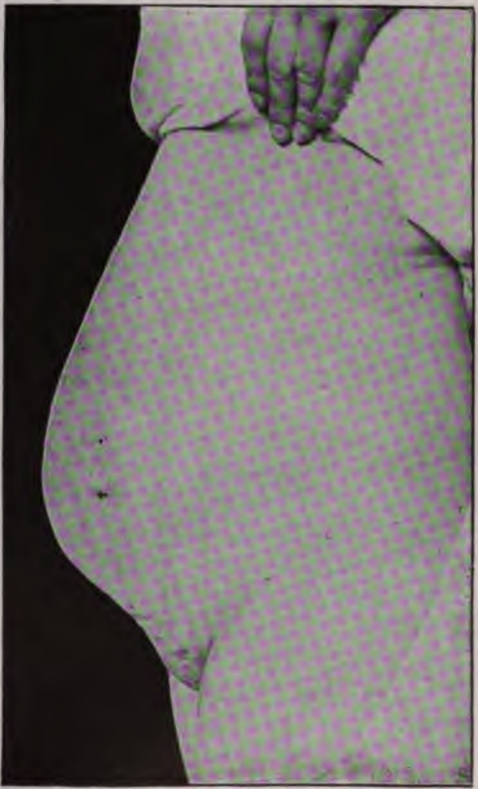


Fig. 128. Same patient (Fig. 127), Standing. Notice the marked Projection of the Relaxed Abdominal Wall.

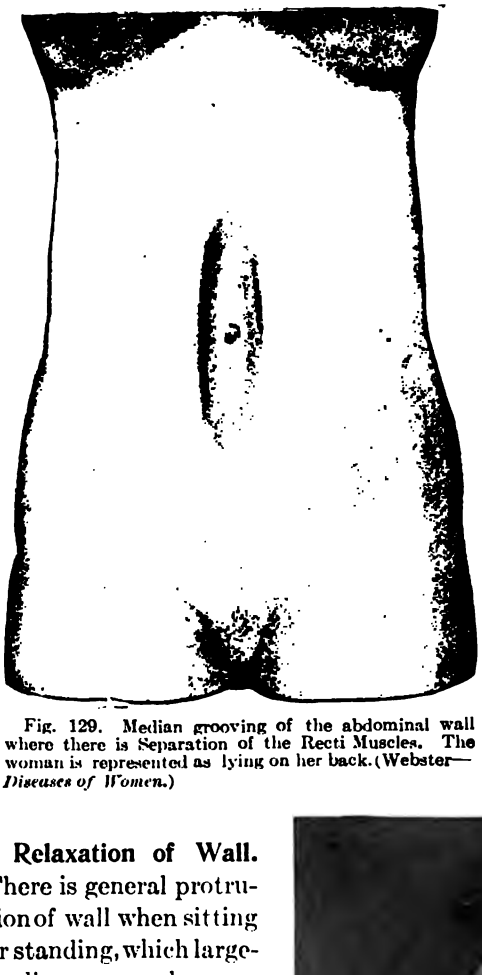


Fig. 129. Median grooving of the abdominal wall where there is Separation of the Recti Muscles. The woman is represented as lying on her back. (Webster—*Diseases of Women.*)

large and so near the surface that it was thought necessary to open it at once. It was opened as far as possible from the median incision. The patient recovered.

Ventral Hernia. There is a distinct localized protrusion, which is most pronounced when standing or sitting, and diminishes when the patient lies down. Coughing makes the mass prominent and gives a distinct impulse to it. The mass is resonant on percussion, when containing intestine, and is partially or wholly reducible. When the mass is reduced, the margin of the opening may be felt. Fig. 125 shows an umbilical hernia. Fig. 126 shows a ventral hernia in an operative scar. When strangulated and so inflamed as to prevent satisfactory palpation, a ventral hernia may give much trouble in diagnosis, particularly if it contains only omentum.

Relaxation of Wall. There is general protrusion of wall when sitting or standing, which largely disappears when patient lies down, unless tympanites is pronounced (Figs. 127, 128), On palpation the walls are lax and no abnormal mass is felt. The abdomen is everywhere resonant on percussion.

Separation of Recti Muscles. The recti muscles are ordinarily held firmly together by the junction of the sheath of one side with that of the other side,

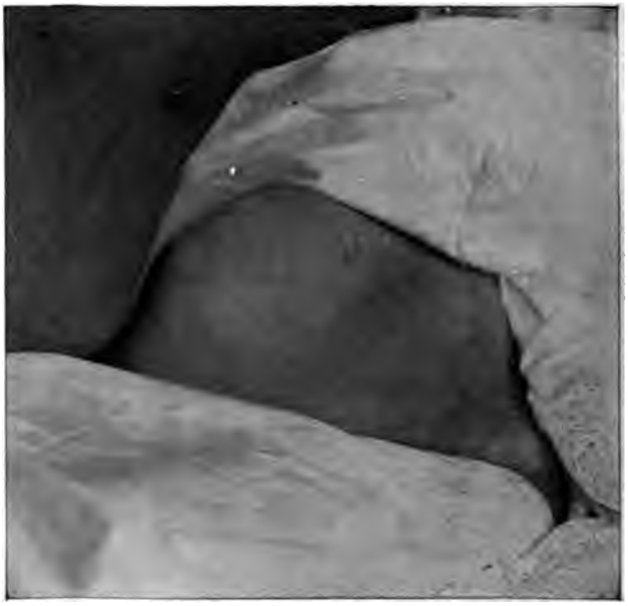


Fig. 130. Patient with marked Separation of the Recti Muscles. The illustration shows the marked bulging between the separated recti as the head and chest are raised from the table, the abdominal muscles being thus made to contract. (Webster — *Diseases of Women.*)

forming a strong fibrous septum in the median line. In some cases of abdominal distension from pregnancy or a tumor, the tissue between the recti muscles is greatly

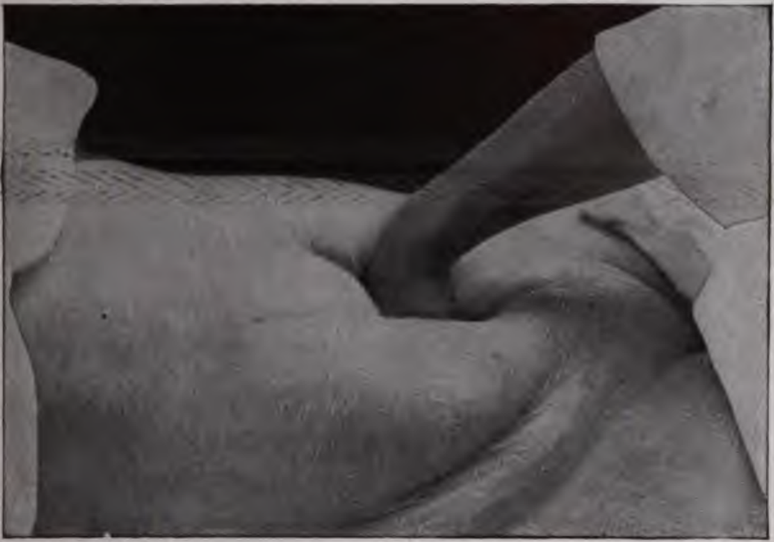


Fig. 131. Patient with marked Separation of the Recti. The photograph from which this illustration was made, was taken as the upper part of the body was being raised from the table. The physician's fist is buried in the gap between the muscles, which are contracting. In this case there was pronounced pendulous abdomen. As the patient lay relaxed on her back, the distance between the muscles at the level of the umbilicus measured five and one-half inches. (Webster—*Diseases of Women*.)

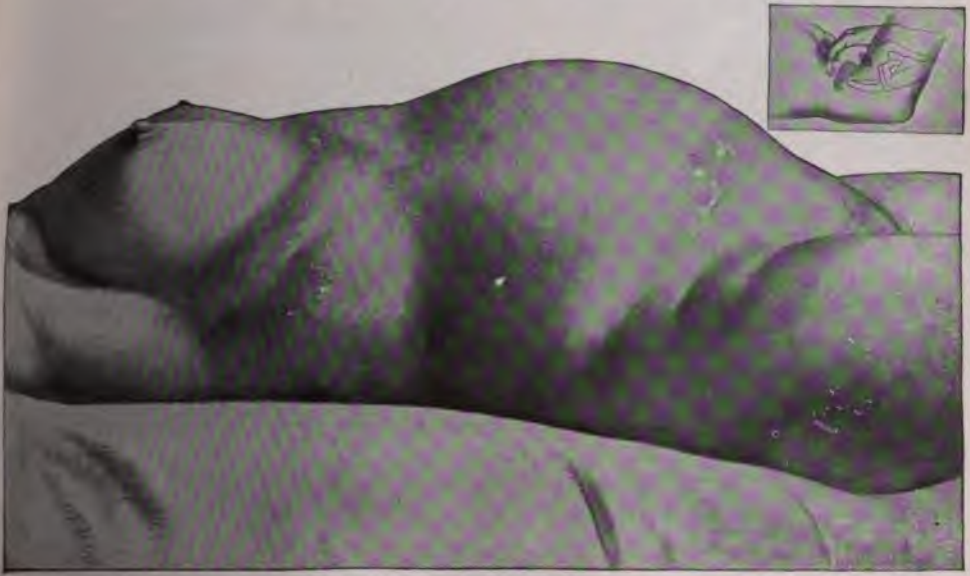


Fig. 132. Tympanites, mistaken for pregnancy by the patient. The small figure in the upper corner shows the internal condition as determined by the bimanual examination, the uterus being of normal size. *ractice of Obstetrics*.)

stretched laterally and remains so. This gives a wide weak place between the recti muscles, in which the tissues are lax and thin (Fig. 129). When the patient raises her head and shoulders from the pillow, or otherwise makes strong intra-abnominal pressure, there is bulging of this weak portion of the wall between the recti (Fig. 130). In such a case, the hand may be sunk deeply into the abdomen between the separated recti muscles (Fig. 131).

B. Abdominal Prominence from Something in Intestines.

Gas (tympanites). This may cause marked prominence when associated with relaxation of abdominal wall. There is no distinct mass felt on palpation. Percussion shows hyper-resonance over all the abdomen. There are usually symptoms indicating gastric or intestinal indigestion. Tympanites is frequently associated with enteroptosis. Fig. 132 shows tympanites which the patient mistook for pregnancy.

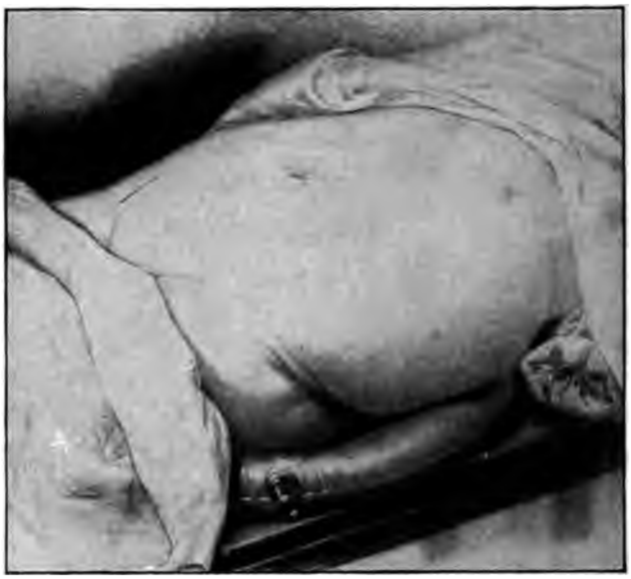


Fig. 133. Ascites. A moderate amount of fluid in a relaxed abdomen. Notice how the abdomen spreads out at the sides. (Kelly—*Operative Gynecology*.)

Fecal Impaction. Fecal impaction may cause localized prominence in any part of the abdomen but it is usually situated along the course of the colon. The diagnosis depends largely on the exclusion of other causes of enlargement, the history of constipation and the effect of treatment directed toward clearing out the intestinal tract. Have the patient take a purgative until free bowel movements are secured, then a large enema and then return for another examination.

C. Abdominal Prominence from Something in the Peritoneal Cavity.

General Ascites. This may be slight (Fig. 133) or marked (Figs. 134, 135, 136, 137). In ascites, i. e. free fluid in the peritoneal cavity, the abdomen is inclined to spread out at the sides and flatten at the top. There is usually a distinct fluid wave, obtained as previously explained (Fig. 35), which may be distinguised from a fat wave as shown in Fig. 36. When the patient is turned on the side or when she sits or stands, the area of dullness changes, because the fluid seeks the lowest part of the peritoneal cavity. (Figs. 185, 189, 190).

Another diagnostic point is that in some cases where there is free fluid in the peritoneal cavity, when the patient stands there is decided protrusion of the umbili-

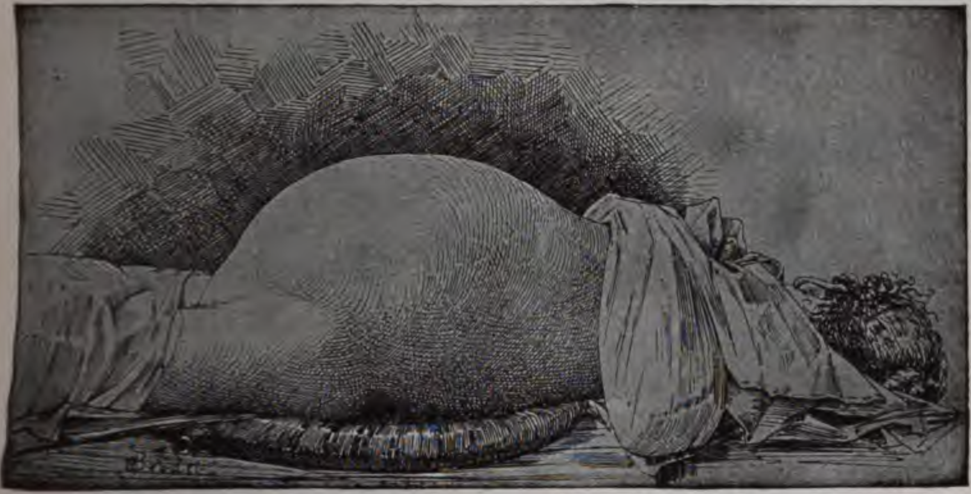


Fig. 134. **Marked Ascites.** Notice the gentle slope at the lower and upper portions of the abdomen. In the case of a tumor the rise is usually much more abrupt. (Kelly—*Operative Genecology.*)

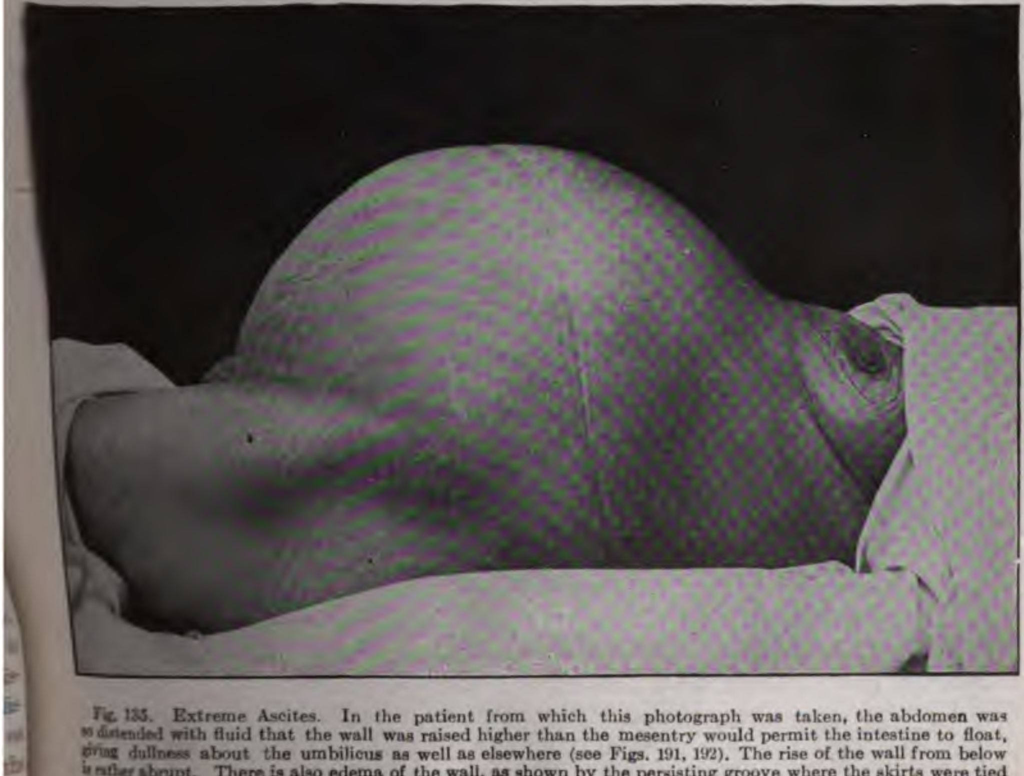


Fig. 135. Extreme Ascites. In the patient from which this photograph was taken, the abdomen was so distended with fluid that the wall was raised higher than the mesentry would permit the intestine to float, giving dullness about the umbilicus as well as elsewhere (see Figs. 191, 192). The rise of the wall from below is rather abrupt. There is also edema of the wall, as shown by the persisting groove where the skirts were tied about the waist.

cus (Fig. 138), which protrusion disappears when the patient is in the recumbent posture.

Encysted fluid (pus or serum or blood). A distinctly limited collection of fluid, walled off or encysted, may be present in peritoneal tuberculosis and also in abscess from salpingitis or appendicitis. There may be considerable solid exudate associated with the swelling, and also other evidences of inflammation, either septic or tubercular. The diagnosis between the two forms of inflammation may usually be readily made from the history and the accompanying symptoms. Extra-uterine pregnancy, like the inflammatory processes just mentioned, may present the evidences of encysted fluid. For the point
nosis, between extra-uterine pregnancy and ordinary p
chapter xi.

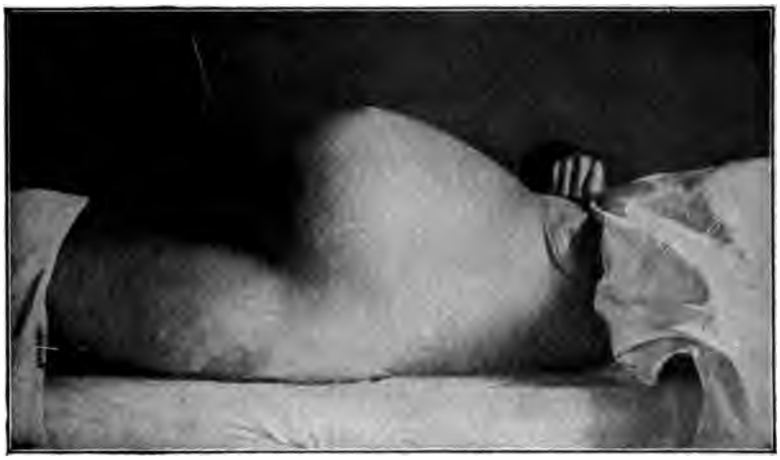


Fig. 136. Another case of extreme Ascites, giving dullness about the umbilicus as well as in the flanks. Notice the markedly pyramidal form of this abdomen. (Hirst—*Diseases of Women.*)

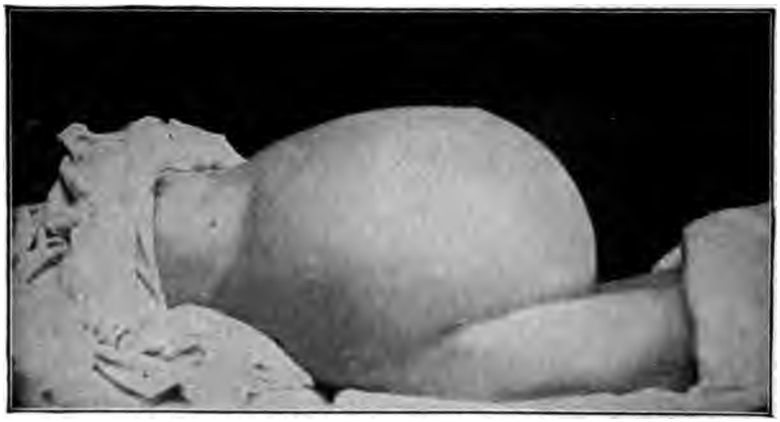


Fig. 137. Another case of extreme Ascites, giving dullness about the umblilicus and and showing a very abrupt rise of abdominal wall below. (Hirst—*Diseases of Women.*)

Pseudo-cyst of the Lesser Omentum. Following injuries of the pancreas or disease of the same, there may be a collection of fluid in the lesser peritoneal cavity, causing prominence of the abdomen and evidence of encysted fluid. The diagnosis is usually made during the progress of the operation. In all these cases of encysted fluid or solid exudate, there is dullness over that portion of the mass lying against the abdominal wall and resonance elsewhere.

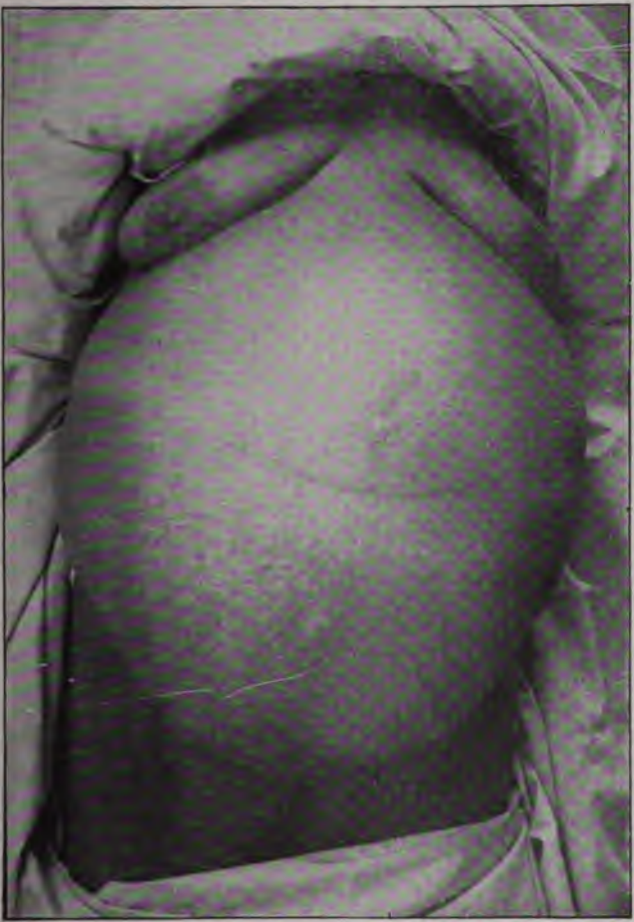


Fig. 138. Extreme Ascites. Patient standing. Notice the protrusion of the umbilicus, which is pushed out by the fluid behind it as the patient stands. This is the same patient shown in Fig. 135.

D. Abdominal Prominence from Some Enlarged Organ.

Uterus pregnant (Fig. 139). There is dullness over the mass and resonance at the sides (Fig. 181). There is no change of outline of dullness on change of position of patient. There are also the various signs of pregnancy, including the fetal heart sounds if the pregnancy is far enough advanced.

Bladder distended with urine. The retention of urine to such an extent that the distended bladder produces a distinct prominence of the abdomen, happens occasionally in pregnancy with retro-displacement of uterus (Fig. 141), in labor (Fig. 140), in pelvic tumors compressing the urethra and in certain nervous affections. There is dullness over the mass and resonance at the sides. There is usually a frequent desire to urinate, with the passage of only a small amount of urine. But there may be a constant dribbling of urine due to over distention. If the bladder be emptied with a catheter the diagnosis becomes clear. Use a long soft-rubber catheter, as the ordinary female catheter may be too short to reach the entrance of the bladder, and if the catheter be not flexible it can not follow the devious

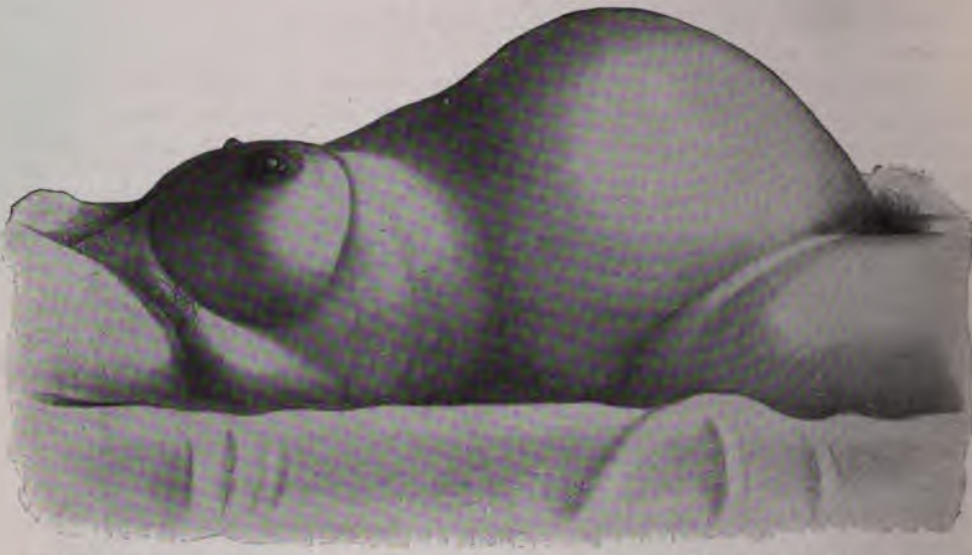


Fig. 139. Contour of the abdomen in Pregnancy, with patient recumbent. (Edgar—*Practice of Obstetrics.*)

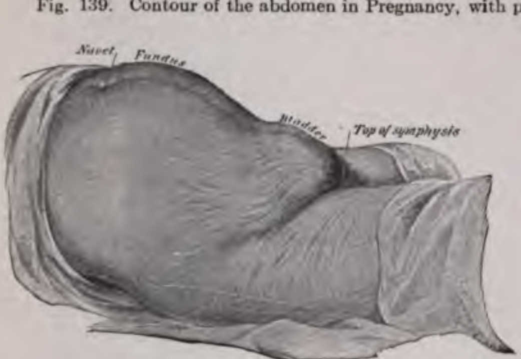


Fig. 140. Contour of the abdomen in a case of Distended Bladder. The patient is in labor. Notice how well the bladder prominence stands out from the general abdominal prominence due to the pregnant uterus. (Norris—*Am. Text-Book of Obstetrics.*)

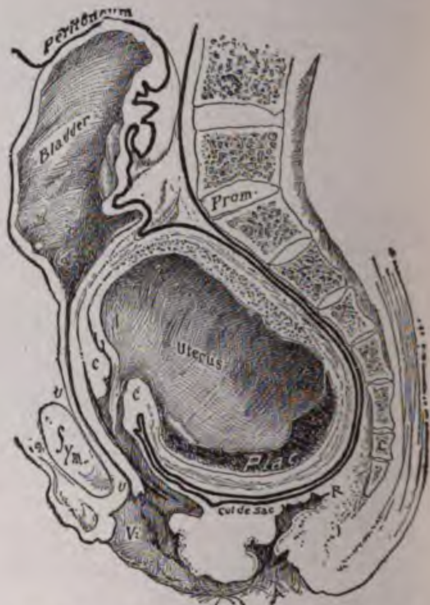


Fig. 141. Frozen section of the body of a woman who died from Rupture of a Distended Bladder. The cause of the retention of urine, was a retroverted uterus four months pregnant. (Norris—*Am. Text-book of Obstetrics, from Arch. of Gyn.*)

course of the distorted urethra. Patients have died from rupture of the bladder due to unrecognized over-distention (Fig. 141).

Spleen enlarged from chronic malaria, leukemia or other cause.

Liver enlarged from malignant disease, hypertrophic cirrhosis or other cause.

Gall-bladder enlarged on account of occlusion of duct and distension with mucous secretion and inflammatory exudate. It sometimes becomes so much distended as to form a large cystic mass in the right side of the abdomen.

E. Abdominal Prominence from a Tumor.

A tumor projecting up from the pelvis (Fig. 142). Such a tumor has its point of attachment in the pelvis, the free margin of the growth extending upward into the abdominal cavity. The growth may be either cystic or solid. There is dullness over the mass and resonance at the sides (Fig. 182). There is no decided change of outline of dullness with change of position of patient, except where there is complicating ascites. There are found also the usual symptoms caused by the particular variety of pelvic tumor present.

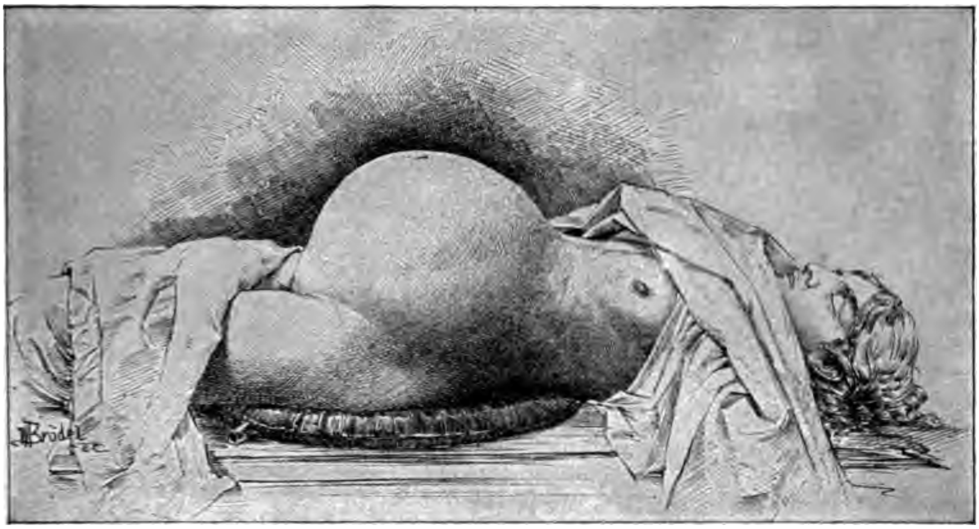


Fig. 142. Contour of the abdomen in a case of large Cystic Tumor (parovarian). Notice the abrupt rise of the abdominal wall at both the lower and upper portions. (Kelly—*Operative Gynecology*.)

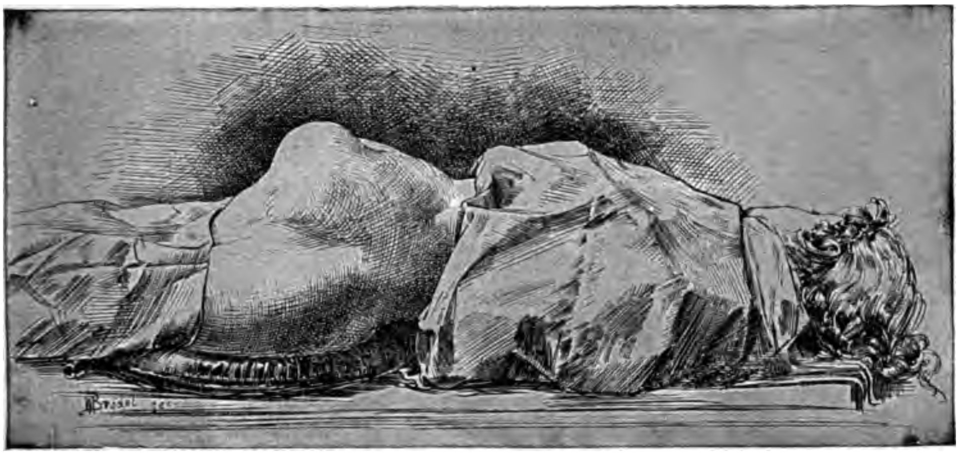


Fig. 143. Contour of the abdomen in a case of large Solid Tumor (uterine fibroid). The irregularity, so common in solid tumors, is well marked. (Kelly—*Operative Gynecology*.)

The ordinary new growths that project up from the pelvis are:

- Fibroid tumor of uterus (Fig. 143).
- Malignant tumor of uterus (carcinoma, sarcoma).
- Cystic tumor of ovary (ovarian cyst, Fig. 144).
- Cystic tumor of broad ligament (parovarian cyst).
- Solid tumor of ovary (fibroma, carcinoma, sarcoma, papilloma).
- Solid tumor of bladder (Fig. 145).
- Solid tumor of rectum.

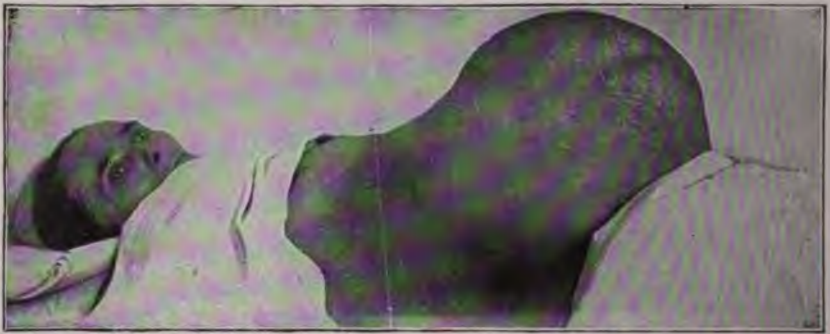


Fig. 144. Another case of large Cystic Tumor. Here the tumor (an ovarian cyst) is extremely large and the rise of the abdominal wall at both lower and upper portions is very abrupt. (Bovée—*Practice of Gynecology*.)

A tumor connected with some abdominal structure (Fig. 146). Such a tumor has its point of attachment in the abdomen with the free margin of the growth extending toward, and sometimes into, the pelvic cavity. There is dullness over that portion of the mass lying against the abdominal wall and resonance elsewhere, unless there be associated ascites. There are symptoms also pointing to the organ affected and the nature of the growth.

The principal tumors that originate in the abdomen are:

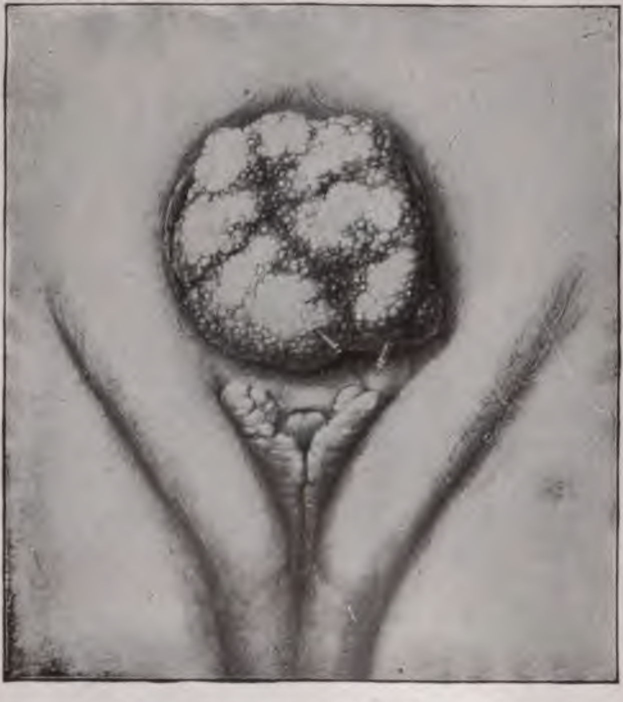


Fig. 145. Appearance of the abdomen in a case of Extrophy of the Bladder. A carcinoma has developed in the deformed and turned-out bladder. (Kelly—*Operative Gynecology*.)

Solid tumors of the caecum, sigmoid, or other parts of the intestinal tract (usually malignant).
Solid tumor of the stomach (usually malignant).
Solid tumor of the liver (usually malignant).
Solid tumor of the spleen.
Solid tumor of kidney.
Solid tumor of pancreas.
Solid tumor of retro-peritoneal structures (Fig. 146).

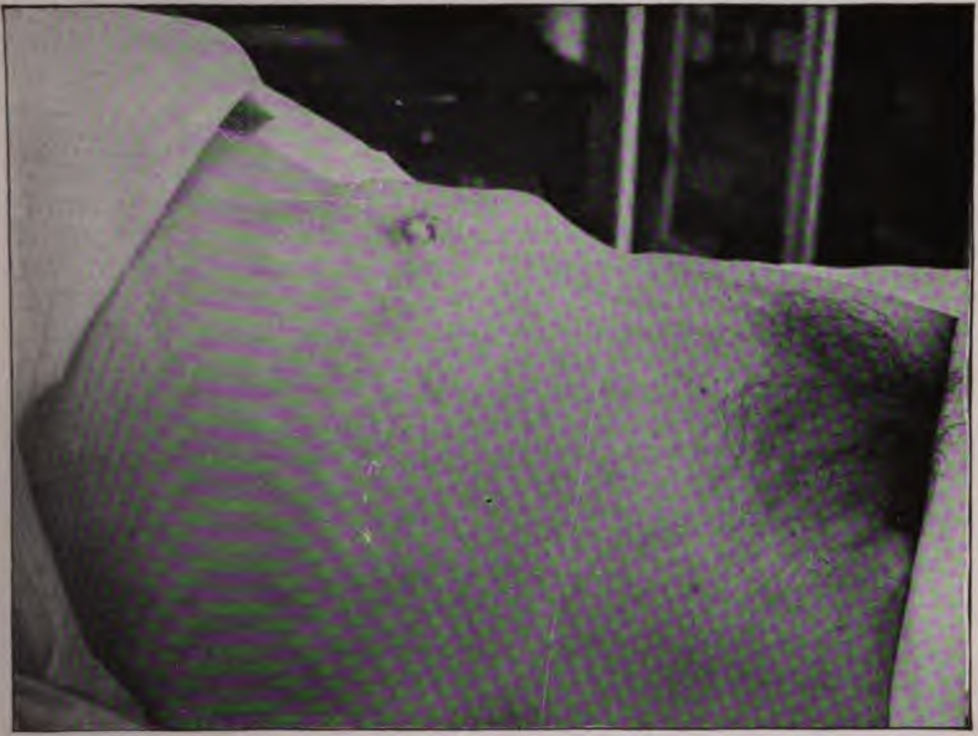


Fig. 146. Contour of the abdomen in a case of Retroperitoneal Tumor (sarcoma). The projecting mass in the region of the umbilicus is well shown. The outline of the palpable mass and also the area of dullness are shown in Fig. 201. (Patient of Dr. Elsworth Smith, Jr., to whose kindness I am indebted for this photograph.)

Cystic tumor of kidney.
Cystic tumor of pancreas.
Cystic tumor of omentum.
Cyst of mesentery.
Pseudo-cyst of lesser omental cavity.

MOVEMENT OF ABDOMINAL WALL.

In certain cases some information may be obtained by watching the movements of the abdominal wall.

In **painful affections** within the abdomen, such as peritonitis or intra-peritoneal hemorrhage or intestinal obstruction, the wall is held rigid to a considerable extent and the respiratory movements of the wall are very slight.

In the case of a **tumor splinting the wall,** the portion of the wall raised by the tumor remains stationary, while the remainder shows the respiratory movements.

It is important to know whether or not a **tumor moves with respiration.** As a rule a tumor of an abdominal organ moves up and down with the diaphragm in respiration, and this up and down movement may often be distinctly seen and felt through the wall at the lower margin of the growth or at the prominent part of the mass. If the tumor is firmly adherent to the wall, this movement under the wall can not then take place. In some cases this fact may be turned to account in determining the presence or absence of adhesions. A growth from the pelvis does not move with respiration.

Movement of the child may sometimes be plainly indicated in late pregnancy by a prominence moving beneath the wall, due to an extremity moving from one part of the uterus to another and pushing out the wall as it moves.

Occasionally the **intermittent contraction** of a pregnant uterus may be noticed by its raising the wall as it becomes firmer and more prominent.

Pulsation of the abdominal wall may be due to an aneurysm. Not infrequently, especially in thin patients, the pulsations of the normal aorta are transmitted to the overlying wall, either directly or through an intervening tumor.

In some cases of intestinal obstruction or marked tympanites, a distinct **peristaltic wave** may occasionally be seen to pass across the abdomen in the course of the distended bowel. It is usually accompanied by a cramp-like pain.

DISCOLORATION OF ABDOMINAL SURFACE.

Occasionally there is a well-marked central line of **pigmentation,** extending from the pubes to the umbilicus (Fig. 20). This is usually the result of a previous pregnancy.

Dilated veins at the lower part of the abdominal surface, as a rule mean that there is some mass compressing the intra-pelvic veins.

Edema of the wall may be due to inflammation in the wall, or to heart or liver or kidney disease.

Striae (Fig. 18) from a former stretching of the wall, usually mean a former pregnancy continuing to near term, but they may come from any large tumor or from a former obesity of the abdominal wall. Such striae are occasionally seen on the thighs of patients who have been stout.

When the **wall is relaxed,** i. e., has been overstretched and has not regained its tone, it is very uneven and the skin appears wrinkled and corrugated. This folded redundant condition is nearly always present in decided enteroptosis.

The **eruption** of secondary syphilis (syphilitic roseola) is occasionally of decided help in determining the character of an atypical vulvar lesion. An eczema or other eruption near the site of a proposed operative incision, may necessitate postponement of the operation until the eruption is removed.

A **scar** indicates that there was at one time a burn or a blister or an area of ulceration of the wall or an injury of the wall or an operative incision (Fig. 160).

TENSION OF ABDOMEN.

Tension of the abdominal wall interferes very much with a thorough pelvic examination. It is due to one of the following conditions:

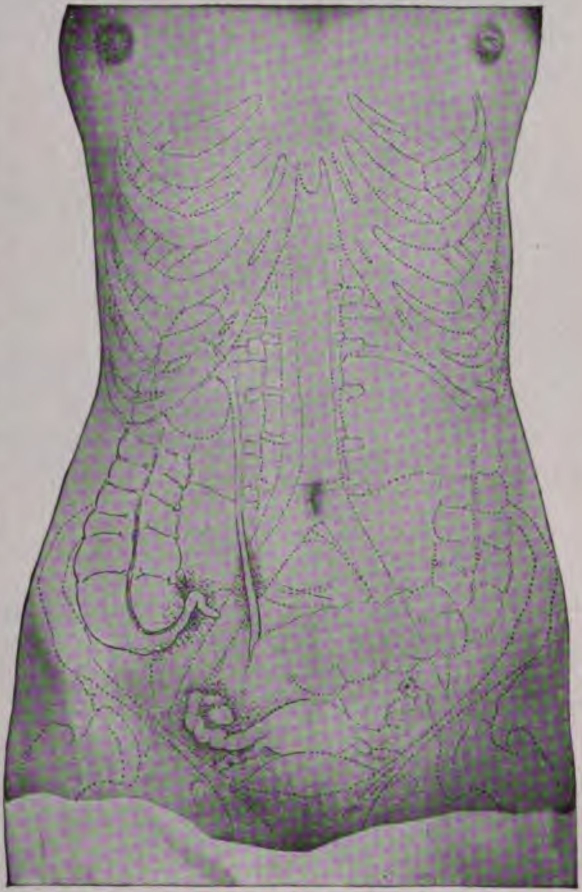


Fig. 147. The Right Lower Abdomen. The organs commonly affected and the areas accordingly of particular interest, are indicated by the stippling

Fear or timidity or embarrassment, causing the muscular wall to be held tense. This tension usually disappears as the examination progresses and the patient sees that you are not going to cause pain. Even in very troublesome cases, relaxation of the wall may usually be secured by directing the patient to take a full breath and then let the breath all out. During expiration, when not forced, the wall relaxes and deep palpation may be made. In sinking the fingers into a region or about a mass for palpation, proceed gently and firmly and steadily toward the desired point, going a little deeper with each expiration. Do not gouge or jab or endeavor to reach the depths of a region by sudden forced movements. These all invite failure by causing reflex contraction of the abdominal muscles.

Inflammation, local or general, beneath the wall causes tension of the overlying muscles. This tension is usually both voluntary and involuntary. The patient can relax the wall to some extent but not entirely, providing the inflammation is acute and severe. There is also marked tenderness over the affected area and other evidences of an inflammatory affection.

Mass, solid or containing fluid. If lying immediately beneath the wall this gives a sensation of tension or resistance to the palpating fingers. In exceptional cases, as in an extra large tumor or very marked ascites, the abdomen may be so filled that the outer abdominal wall is stretched and tense.

Hysterical contraction of the muscular wall is sometimes seen. When taking place in an irregular way (part contracted and part relaxed) and associated

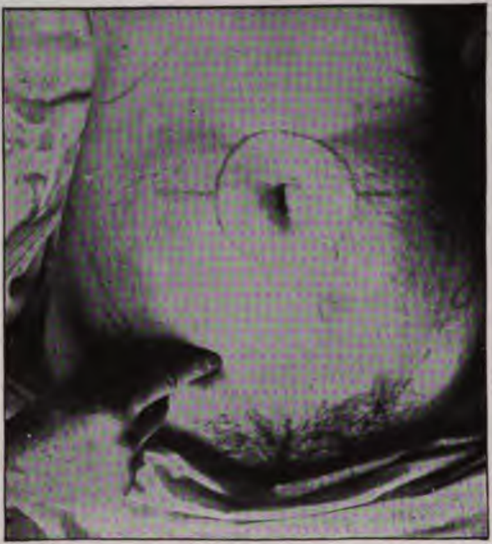


Fig. 148. Indicating the point to seek for Tenderness due to Tubal or Ovarian disease of the right side.

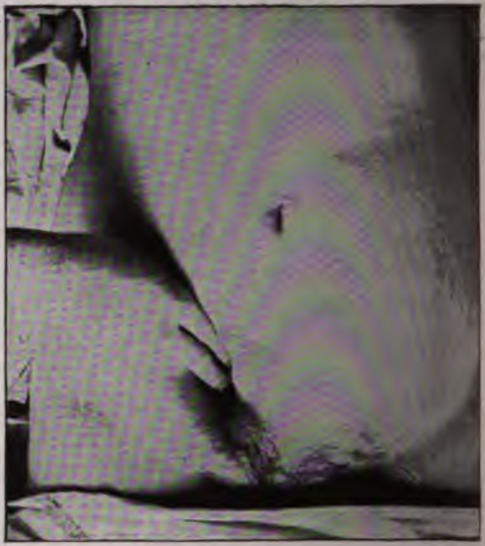


Fig. 149. Palpating for Tenderness or a Mass in the Right Tubo-ovarian region.

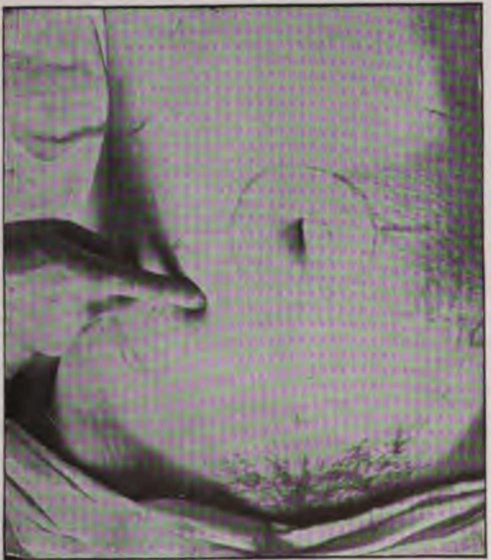


Fig. 150. Indicating the point to seek for Appendix Tenderness.

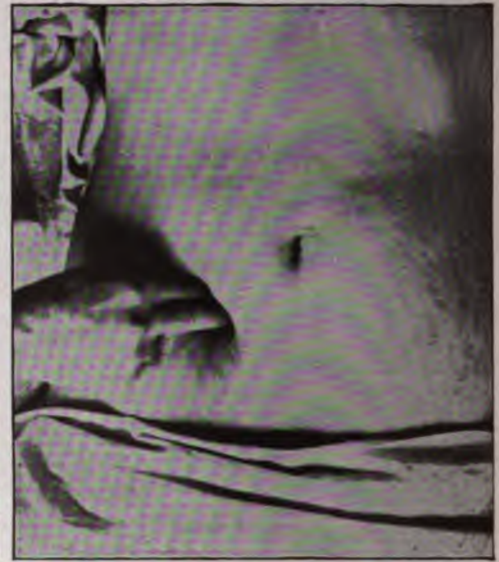


Fig. 151. Palpating for Tenderness or a Mass in the Appendix Region.

with tympanitic distension and with marked hyperesthesia, it may cause the condition known as "phantom tumor," which has led to so many serious mistakes in abdominal diagnosis. The administration of a purgative to clear out the intestines and diminish the tympanites and of some nerve sedative to diminish the hyperesthesia and nerve irritability, may remove the tension sufficiently to admit of a satisfactory examination. If not, the patient should be examined under anesthesia, provided the symptoms are serious enough to make a positive diagnosis necessary at once. Under anesthesia the tension of the abdominal wall disappears, and deep palpation may be made in the affected region and the presence or absence of an abnormal mass determined.

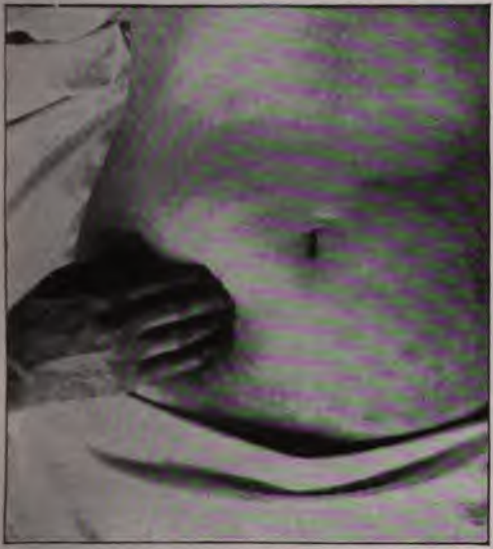


Fig. 152. Palpating for the Appendix itself, to determine whether or not there is any appreciable infiltration and thickening of it. When thickened, the appendix is felt as a small tender roll, deeply placed.

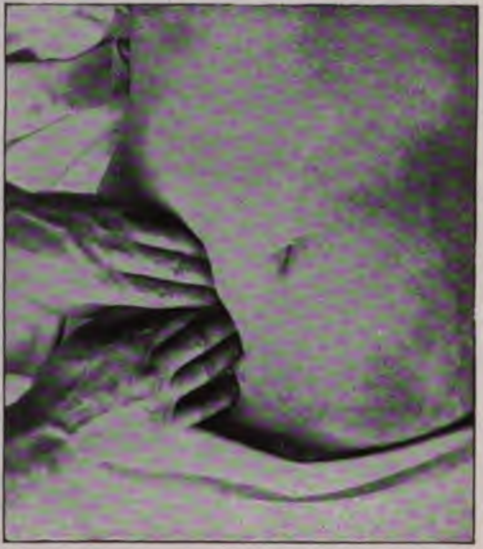


Fig. 153. Another method of palpating the Appendix. Beginning near the umbilicus, the fingers are carried in deeply and then brought slowly outward toward the anterior superior iliac spine. As the appendix passes under the examining fingers, it is felt as a small roll between the fingers and the posterior abdominal wall.

TENDERNESS IN ABDOMEN.

For the purpose of studying the significance of tenderness in the abdomen, it is convenient to divide thecavity as previously explained,into nine regions: the right, left, and central portions of the lower abdomen; the right, left and central portions of the upper abdomen; the central portion of the abdomen (umbilical region); and the right and left lumbar regions (Fig. 30).

In any of these, a local tenderness takes on particular significance.

Again, there are certain diseases that cause a diffuse tenderness, extending throughout the whole abdomen.

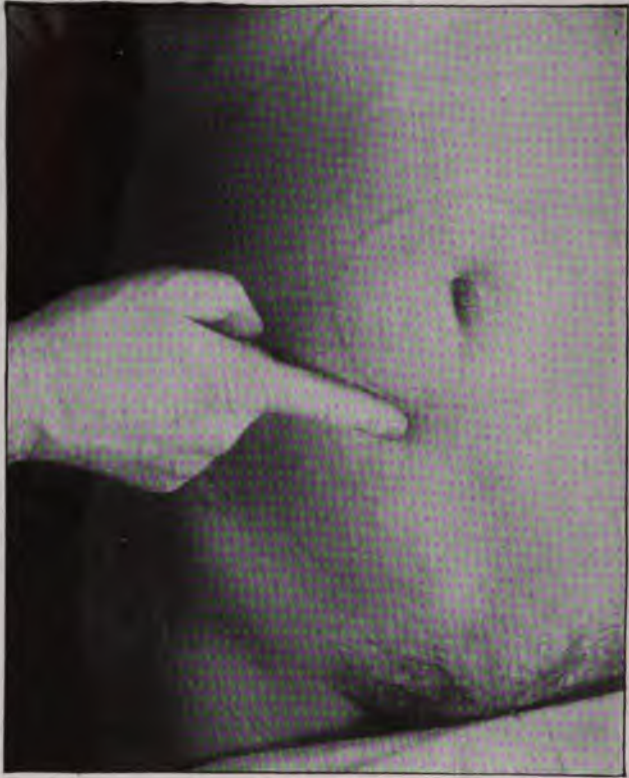


Fig. 154. Indicating the site to search for Tenderness of the Right Ureter. This may be found anywhere from the point indicated to some distance inside the circle, towards the umbilicus.

Tenderness in Right Lower Abdomen (Fig. 147).

Tubal or Ovarian or Broad Ligament Disease (inflammation, tumor, extrauterine pregnancy). The tenderness is most marked low in the side near Poupart's ligament (tubo-ovarian region, Figs. 148, 149). It does not ordinarily extend to the appendix region though it may, in exceptional cases, involve both regions. A mass may be felt on vagino-abdominal palpation between the uterus and the pelvic wall. There is a history of uterine and pelvic inflammation or other pelvic disturbance.

Appendicitis. Tenderness is most marked at about the middle of a line drawn from the right iliac spine to the umbilicus (McBurney's point, Figs. 150, 151). By sinking the fingers deeply into the abdomen near the umbilicus and then carrying them outward toward the iliac spine, the appendix may often be felt to roll under the fingers as a tender cord (Figs. 152, 153). There is usually a history of stomach or bowel disturbance and of attacks of pain radiating about the umbilicus and finally settling down in the appendix region.

Some Disease of the Caecum or Ascending Colon. Inflamma-

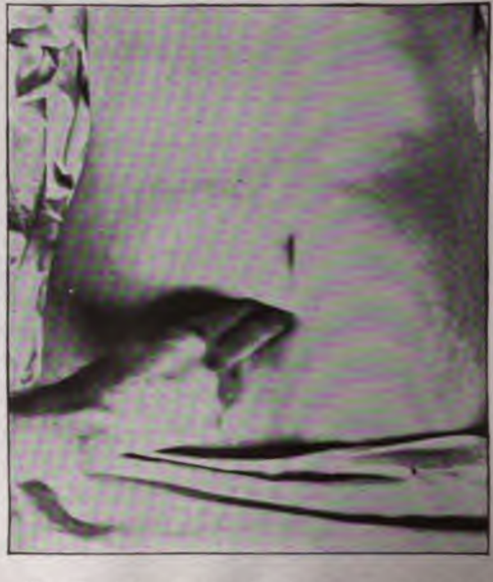


Fig. 155. Palpating for Tenderness or Thickening about the Right Ureter.

tion, tumor and intussusception are the more common affections of the caecum. They present much the same local signs as mild appendicitis. The tenderness and the mass are not localized to the appendix region, however, but extend up along the ascending colon.

Ureteritis. There is a painful point over the ureter (Figs. 154, 155) and tenderness extending up and down the course of the same (Fig. 147). There is usually pain extending from the kidney along the ureter, to the bladder. There is nearly always decided tenderness over the kidney (Figs. 162, 163 and 164).

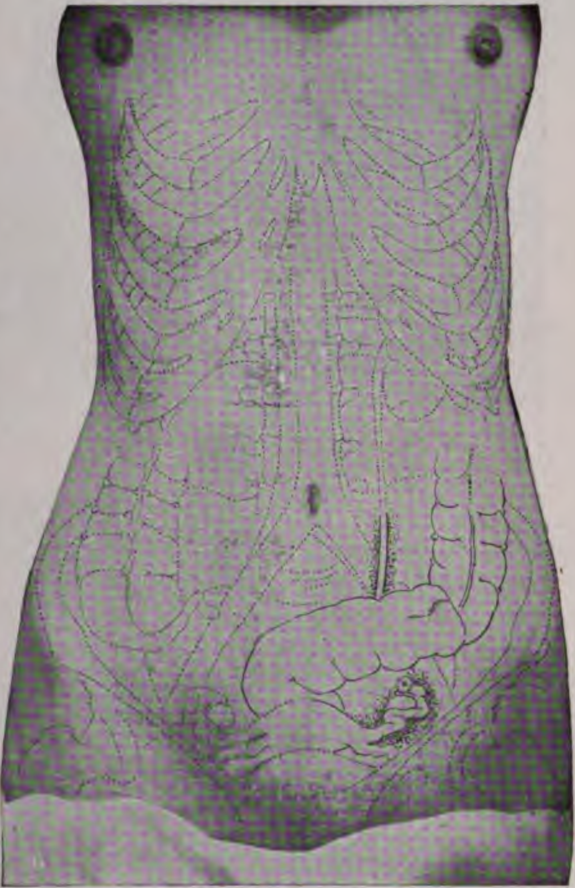


Fig. 156. The Left Lower Abdomen. The organs commonly affected and the areas accordingly of particular interest, are indicated by the stippling.

Movable Kidney. A rounded mass is felt on deep palpation in or near the appendix region. It is somewhat tender. It is movable and may be displaced upward into the kidney region. Special methods for palpating same are shown later (Figs. 413, 414). There is a history of irritable bladder, particularly when standing or walking. There may be pain radiating from the kidney region along the ureter to the bladder. The urinary findings will indicate whether or not there is inflammation or irritation along the urinary tract.

Kidney disease, for example, a tumor or tuberculosis or inflammation, may cause tenderness extending from the kidney down into the right lower abdomen. Kidney disease is indicated by tenderness and enlargement found in palpation, and by the urinary findings.

Intestinal Disease. Painful diseases of the small intestine, either acute or chronic, may give rise to tenderness in the right lower abdomen.

Tubercular Peritonitis and other forms of peritoneal disease occasion tenderness here, when extending to this region.

Nervous affection. Various organic and functional nervous diseases cause marked ess of the abdominal surface and of the intra-abdominal structures. The pain complained is out of proportion to any obvious sign of disease. By palpating over the abdomen it is found that there is tenderness everywhere, even up on the chest walls. Pinching up the skin may cause almost as much pain as the pressure on deeper structures. General observation of the patient will show that she is nervous. Special examination will show evidence of neurasthenia, hysteria or other disease of the nervous system.

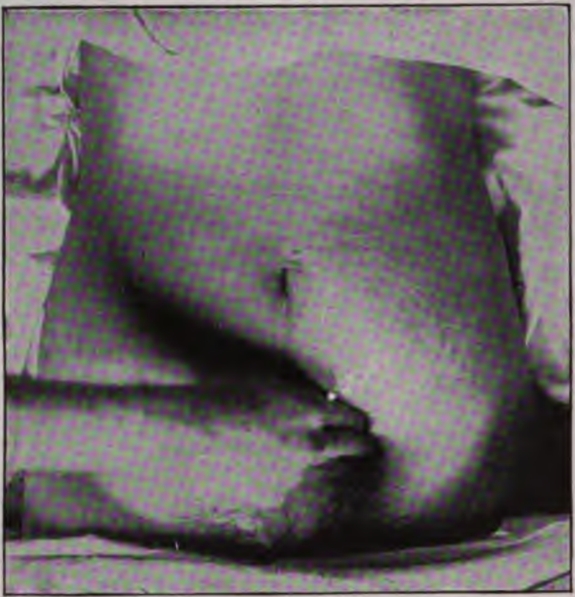


Fig. 157. Palpatating for Tenderness or a Mass in the Left Tubo-ovarian region.

Tenderness in Left Lower Abdomen (Fig. 156).

The affections that cause tenderness in the left lower abdomen are the same as those just given for the right lower abdomen, substituting the sigmoid flexure and the descending colon for the appendix, caecum and ascending colon. Fig. 157 shows palpation for left tubo-ovarian tenderness and Fig. 158 indicates the point for left ureteral tenderness.

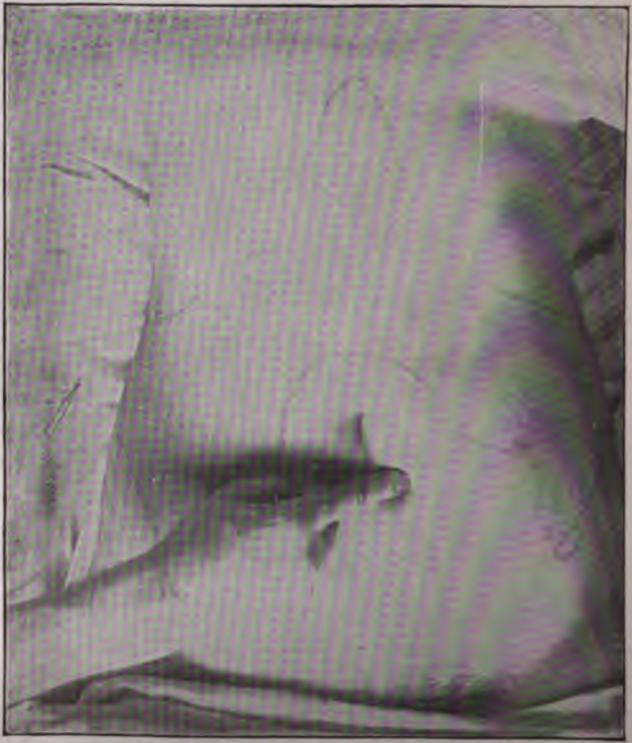


Fig. 158. Indicating the place to search for Tenderness or Infiltration about the Left Ureter.

Tenderness in Central Lower Abdomen (Fig. 159).

Intestinal Disease. There are many affections of the intestines that give pain on pressure in the central lower abdomen, for example, ordinary enteritis, mucous enteritis, tubercular enteritis and typhoid fever. The tenderness is widespread, usually extending into the upper part of the abdomen. There are also the gastro-intestinal symptoms that accompany these diseases and, in addition, the symptoms and signs peculiar to each disease.

Inflammation of Uterus. The tenderness is confined to the central part of the lower abdomen (Fig. 160) and is elicited usually only by deep pressure. There are also the various special evidences of uterine inflammation.

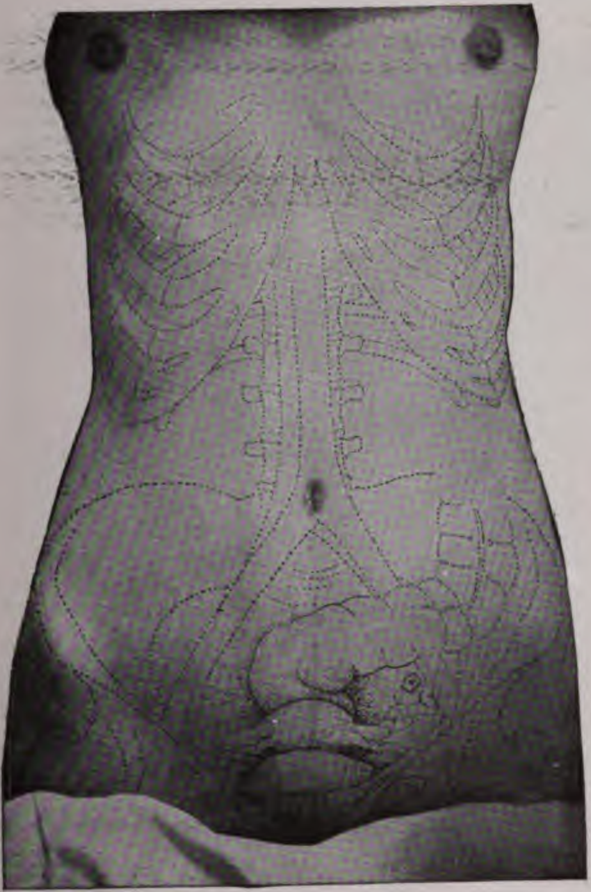


Fig. 159. The Central Lower Abdomen, showing the organs commonly affected by local disease.

Pelvic Inflammation. Pelvic inflammation in any form is likely to give rise to tenderness extending throughout the lower abdomen. Even if the inflammation is confined strictly to the tube on one side, there is usually some tenderness on pressure in the median line. There is a history of pelvic inflammation, with characteristic tenderness of the affected adnexa in the bimanual examination, haps also a distinct mass.

Bladder Disease. The tenderness is very low, just above the pubes (Fig. 161). There is a history of frequent, painful urination. Pressure on the affected region may cause a desire to urinate. Examination of the urine will show evidences of bladder or kidney disease.

Tubercular Peritonitis. This tenderness is widespread over the abdomen. There is encysted fluid or a mass of exudate or general ascites. The trouble is usually chronic. There may be evidence of tuberculosis elsewhere (lungs, intestines). There is no apparent focus of ordinary infection, such as salpingitis or appendicitis.

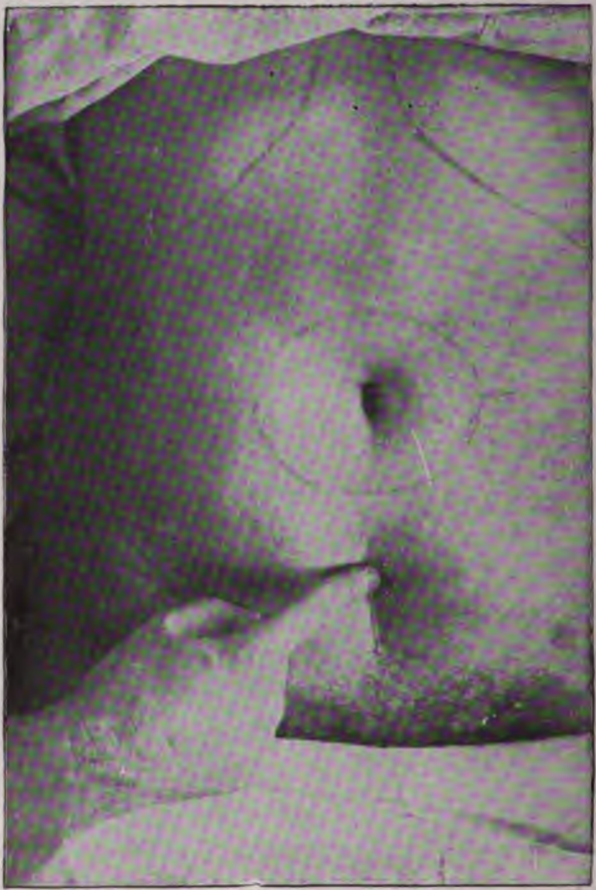


Fig. 160. Indicating the place to seek for Tenderness of the Uterus.

Tenderness in Right or Left Lumbar Region.

Renal and Suprarenal affections are the pathological conditions peculiar to the lumbar regions, and the usual causes of tenderness there. Fig. 162 shows the point to seek for kidney tenderness in front. Fig. 163 indicates the point in the lateral lumbar region to make pressure for kidney tenderness, and Fig.

164 shows the point posteriorly. Fig. 165 shows the area for kidney tenderness in the left lumbar region, and Fig. 166 shows the method of palpating for a mass in the same region, one hand being placed behind and the other in front so as to catch the structure between the palpating fingers.

Tenderness in Right Upper Abdomen (Fig. 167).

Diseases of the Gall-bladder or of the Liver are the common causes of tenderness in the right upper abdomen, the usual condition being cholelithiasis or hepatitis or tumor of the liver. Fig. 168 indicates the point to seek for gall-bladder tenderness. It may be found anywhere from thepoint indicated by the finger outward to the costal margin. The characteristic gesture of liver tenderness (firm pressure over the liver) is shown in Fig. 13, while Fig. 169 shows the method of palpating for general liver tenderness. Occasionally an affection of the pyloric end

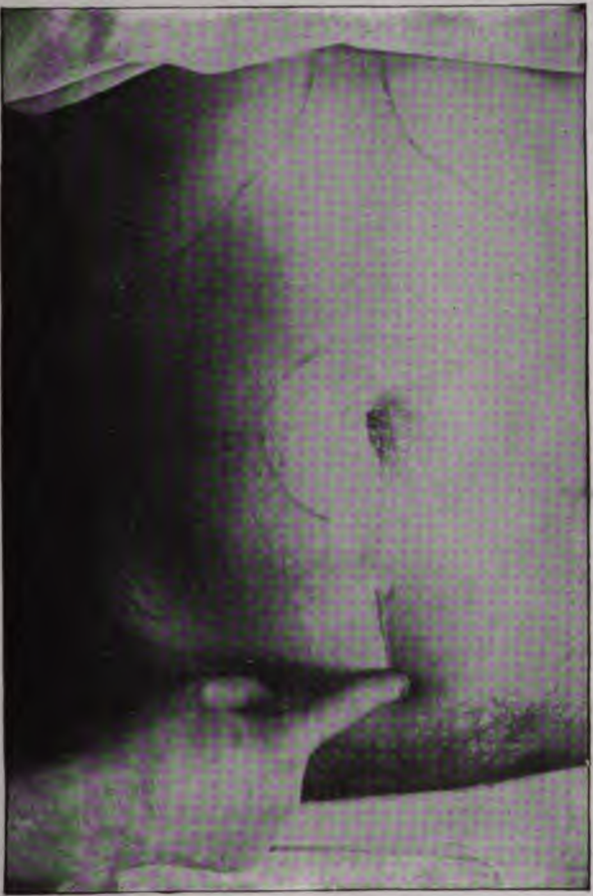


Fig. 161. Indicating the region to palpate for Bladder Tenderness.

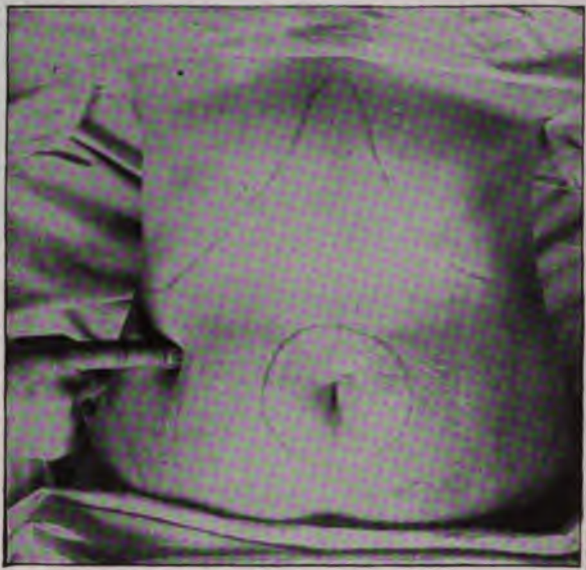


Fig. 162. Indicating the region for Kidney Tenderness in Front, on the right side.

of the stomach or of the duodenum or of the hepatic flexure of the colon or of the right kidney, causes tenderness extending well into the right upper abdomen. But in practically all these conditions the tenderness may be traced out of this region and for a considerable distance along the organ affected.

Tenderness in Left Upper Abdomen (Fig. 170).

Diseases of the **spleen** or of the splenic flexure of the **colon** or of the cardiac end of the **stomach** or of the left

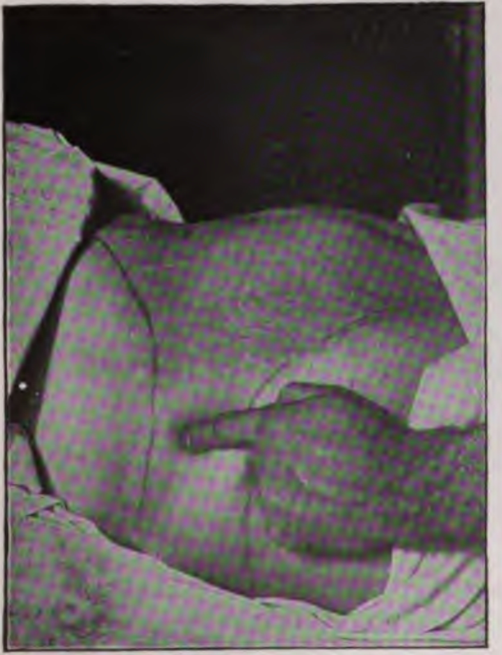


Fig. 163. The point for Kidney Tenderness Laterally.

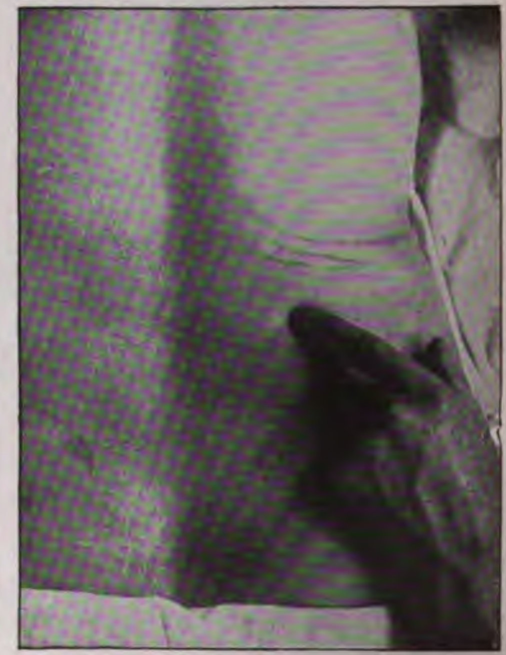


Fig. 164. The point for Kidney Tenderness Posteriorly.

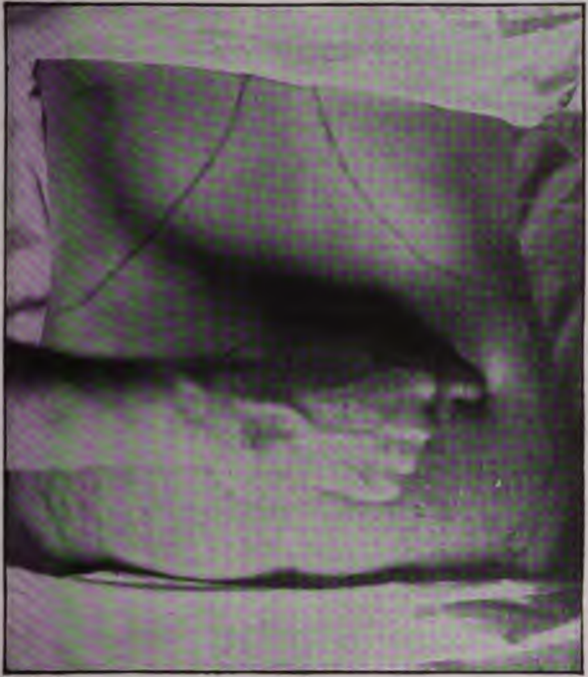
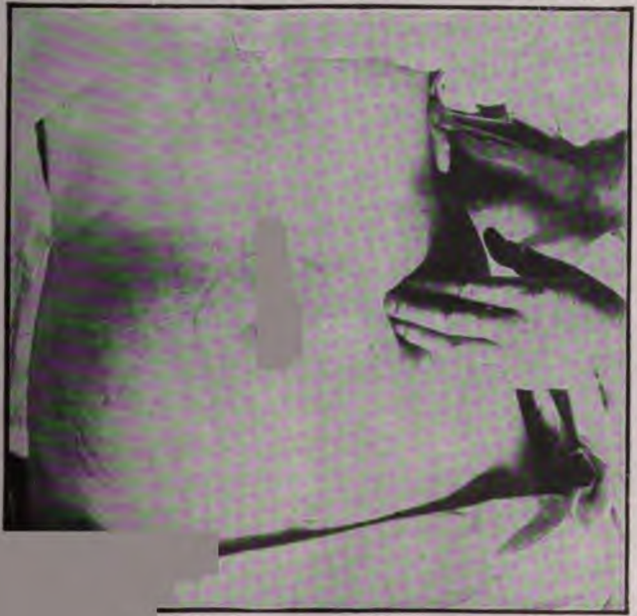


Fig. 165. The area for Left Kidney Tenderness in Front.



Method of Palpating for a Mass in the Kidney Region. The
ught between the hand behind and the one in front.

kidney or **suprarenal capsule**, are the usual causes of tenderness in the left upper abdomen. Fig. 171 indicates the area to search for splenic tenderness. The dragging pain from an enlarged spleen is usually referred by the patient to about this area.

Tenderness in Central Upper Abdomen (Fig. 172).

Tenderness in this region is usually due to an affection of the **stomach** or of the **liver.** Fig. 173 indicates the point to seek for stomach tenderness, and Fig. 174 the point to seek for tenderness of the left lobe of the liver. In doubtful cases, when there is so much widespread tenderness that there is uncertainty as to whether it is from the stomach or the liver, remember that stomach disease is often ac-

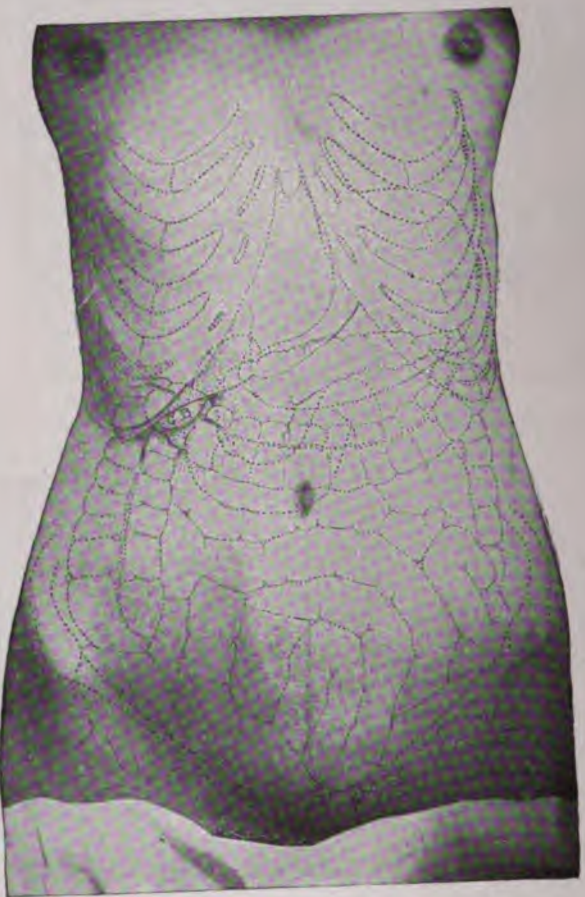


Fig. 167. The Right Upper Abdomen. The site of the gall-bladder, the area of particular interest in this region, is indicated by the letters G. B.

companied by attacks of pain under the left shoulder-blade (usually indicated by the patient as in Fig. 175) while liver disease is frequently accompanied by pain under the right shoulder-blade (Fig. 176). Less frequently, tenderness in the region is due to disease of the **pancreas** or to some affection of the **peritoneum.**

Tenderness in Umbilical Region (Fig. 177).

Diseases of the **small intestine** and diseases of the **peritoneum** and **omentum,** are the usual causes of tenderness localized in this region. In the lower outer portions of the region the ureters encroach, and may cause point tenderness on one or both sides (Figs. 154, 158). Fig. 178 shows palpation for tenderness in the umbilical region.

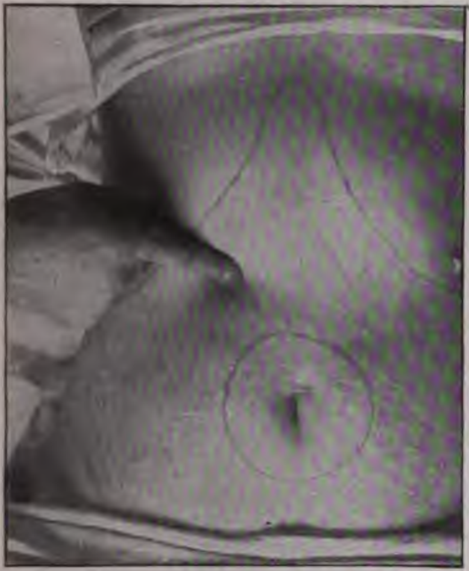


Fig. 168. Indicating the site for Tenderness or a Mass due to disease of the Gall-bladder. It may be found anywhere from the point indicated downward and outward to the margin of the ribs on the right side.

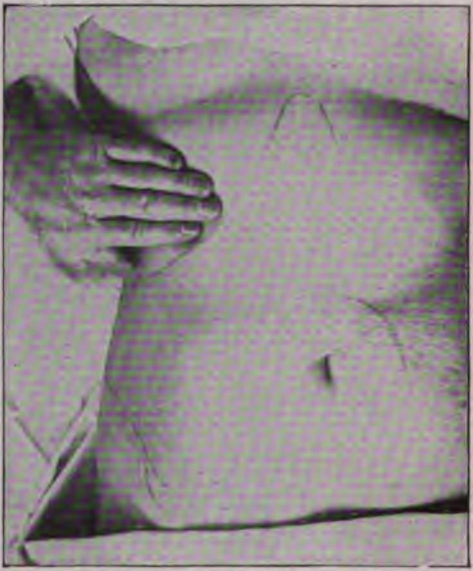


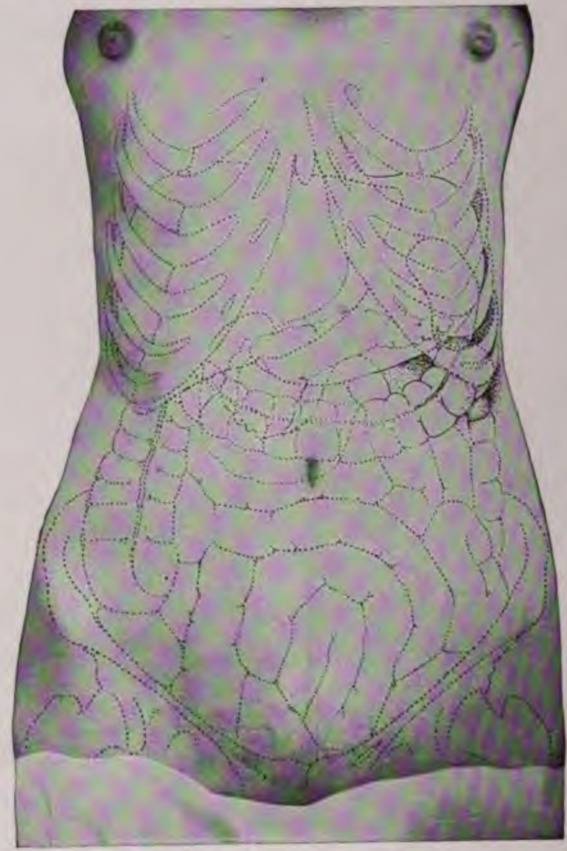
Fig. 169. Palpating for general Tenderness of the Liver.

Diffuse Tenderness Throughout Abdomen.

The usual causes of this are general peritonitis, tubercular peritonitis, gastroenteritis, neurasthenia and hysteria. Appendicitis, gastritis and many other conditions give rise to tenderness or pain which is diffuse at first, but it soon becomes distinctly localized.

MASS FELT ON ABDOMINAL PALPATION.

The masses of particular interest in gynecologic diagnosis are those situated in in the lower abdomen. For exact differential diagnosis these are preferably taken up later. Consequently here I shall simply indicate by name the various masses found. It must be kept in mind, however, that in addition to the various masses that may originate in any region, masses from elsewhere may be found in that region, because of growth or displacement or both. In Fig. 179, the arrows indicate the usual direction of growth, or displacement, of a tumor of the various organs outlined.



Fig, 170. The Left Upper Abdomen. The site of the spleen and of the splenic flexure of the colon, the organs in this region most commonly affected, are shown by the stipling. When normal, the spleen lies considerably higher in the abdominal cavity than is generally supposed. Its anterior projection is shown here in dotted outline, with the lower end in contact with the splenic flexure of the colon.

Mass Felt in Right Lower Abdomen (Fig. 147).

Tubal Inflammation (salpingitis, pyosalpinx, hydrosalpinx).
Tubal Pregnancy.
Tubal Tumor (fibroma, papilloma).
Ovarian Inflammation (oophoritis, ovarian abscess, cystic ovary).
Ovarian Tumor (cystic, solid).
Parovarian Tumor (cystic).

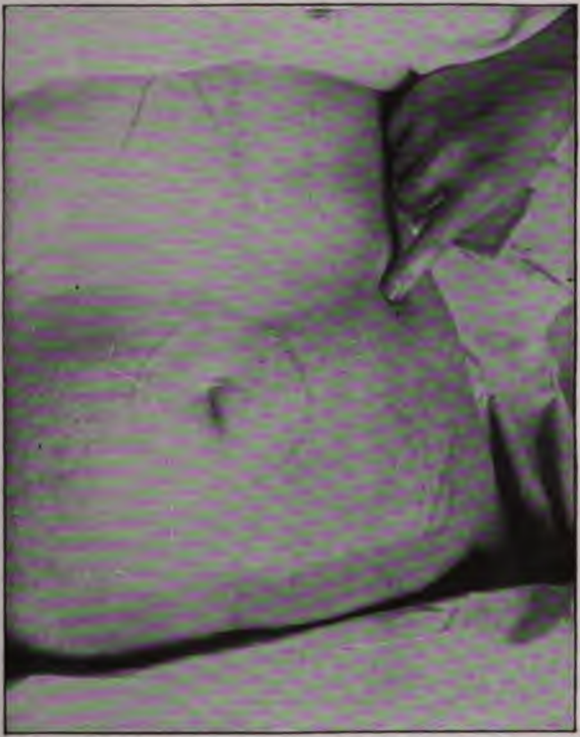


Fig. 171. Indicating the area to search for Splenic Tenderness or Enlargement. When the spleen is diseased it usually becomes enlarged and heavy and sinks below the margin of the ribs at the point indicated.

Fibromyoma of Uterus.
Appendiceal Inflammation or Tumor.
Tumor of Caecum.
Movable Kidney or Tumor of Kidney.

Mass Felt in Left Lower Abdomen (Fig. 156).

Here are found the same conditions as described for the right side, substituting re for caecum and appendix.

Mass Felt in Central Lower Abdomen (Fig. 159).

Pregnant Uterus.
Fibromyoma of Uterus.
Malignant Tumor of Uterus.
Distended Bladder or Tumor of Bladder.
Pelvic Inflammation with Exudate.

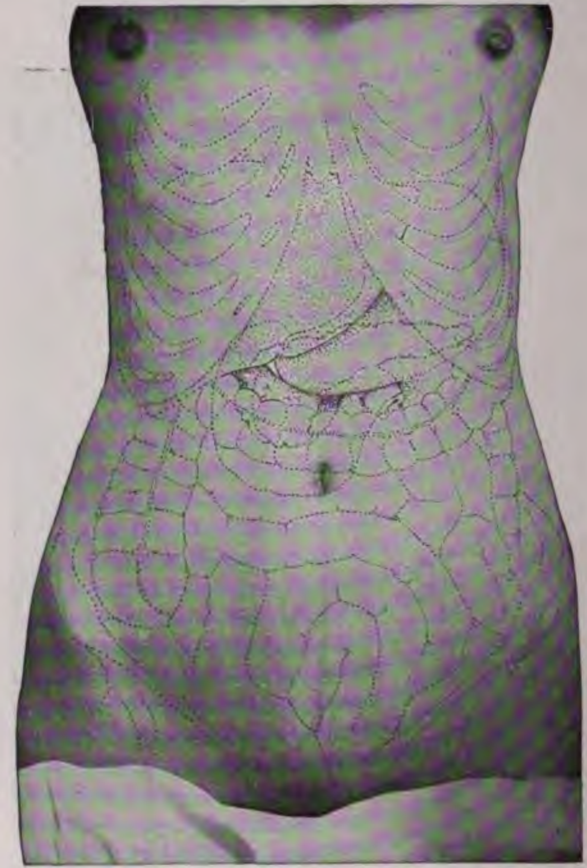
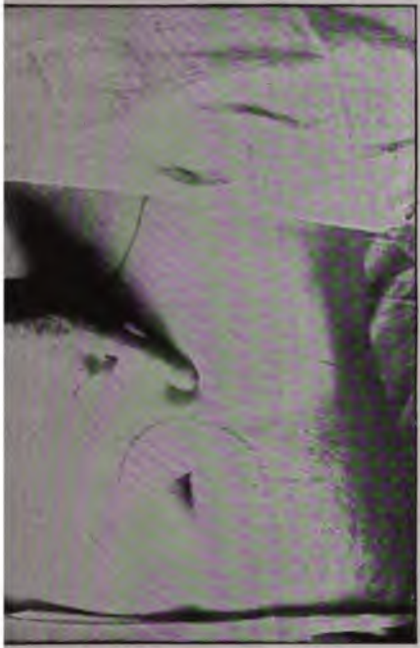


Fig. 172. The Central Upper Abdomen. Showing in outline the liver and stomach and pancreas.

Pelvic Tuberculosis.
Tubal Pregnancy.
Ovarian or Broad Ligament Tumor, growing in from the side.
Appendiceal, Caecal, Sigmoid or Kidney Mass, extending in from th side.
Occasionally, Spleen, Liver, Gall-Bladder, Stomach, Pancreas or Peritoneal Masses, extend into this region.



3. Showing the region for Tenderness or a
n disease of the Stomach or Pancreas.

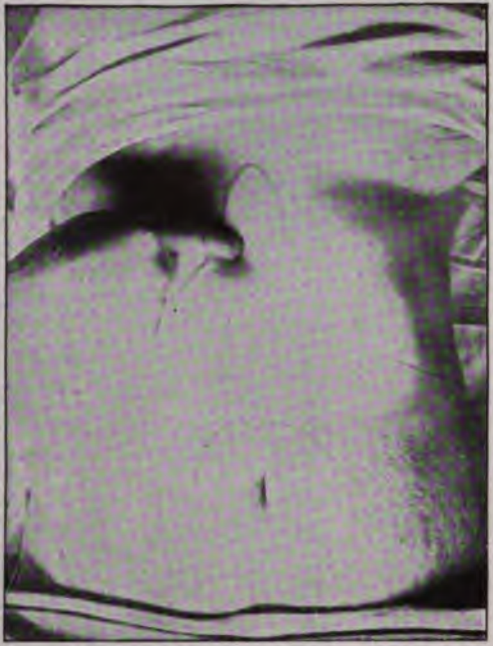
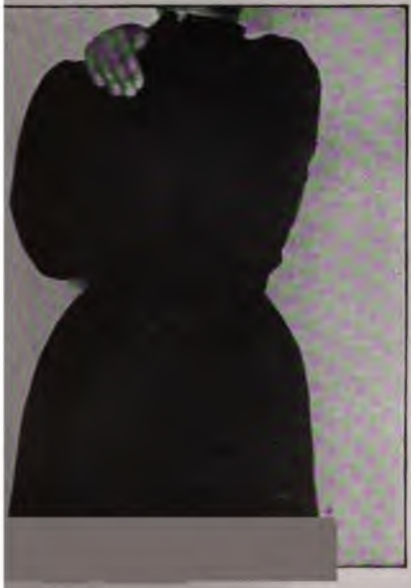


Fig. 174. Showing the site for Tenderness of the Left Lobe of the Liver.



5. The gesture of the patient in indicating pain
e left shoulder-blade—a very frequent accom-
t of Stomach Disease.

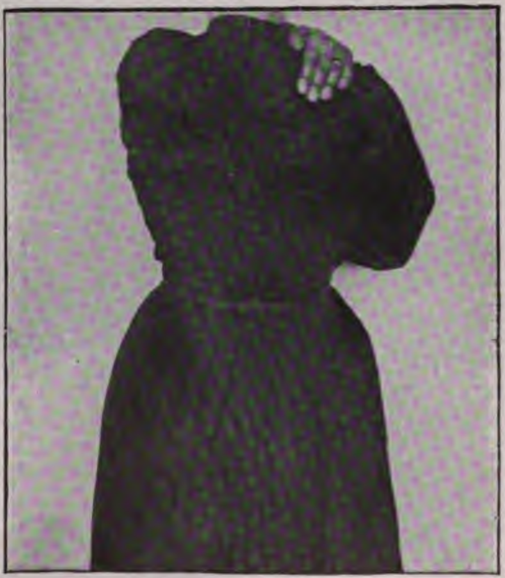


Fig. 176. The gesture of the patient in indicating pain under the right shoulder-blade—a very frequent accompaniment of Liver Disease.

Mass Felt in Right Upper Abdomen (Fig. 167).

Enlarged Liver.
Enlarged Gall-bladder.
Tumor of Liver.
Abscess of Liver.
Tumor of Pyloric End of Stomach.

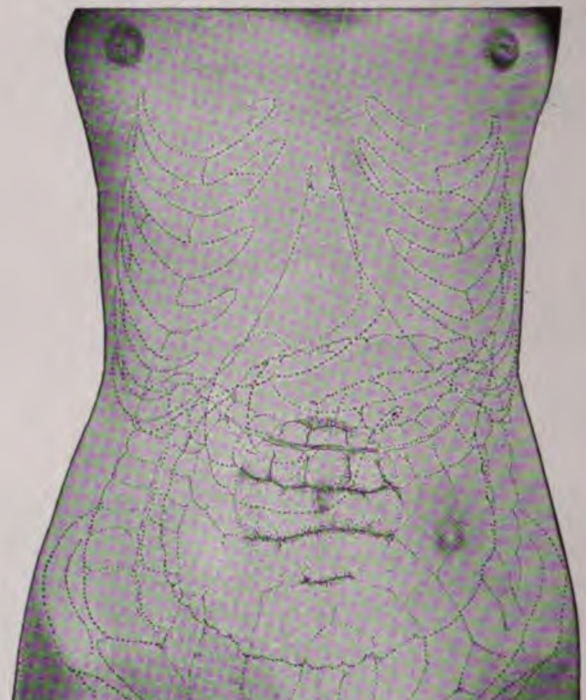


Fig. 177. The Central Abdomen or Umbilical Region, showing in outline the colon and small intestine and omentum.

Tumor of Duodenum.
Tumor of Hepatic Flexure of Colon.
Tumor of Kidney.
Abscess of Kidney.
Tuberculosis of Kidney.

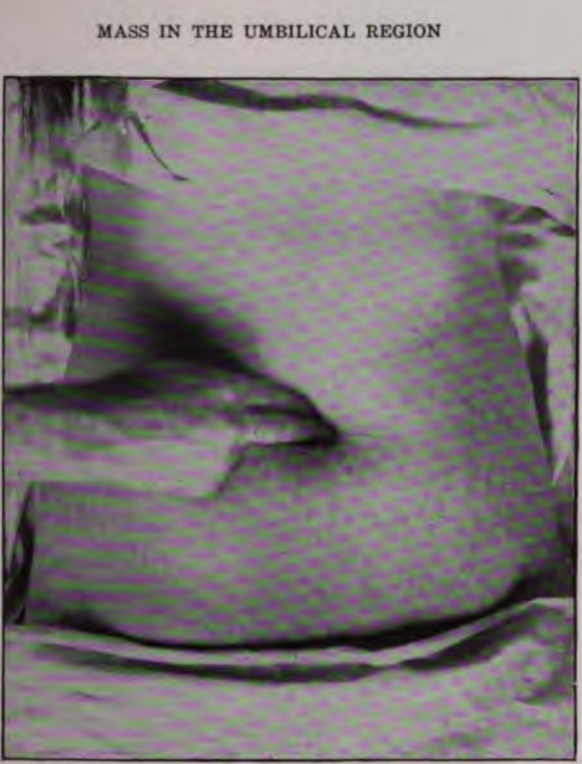


Fig 178. Palpating for Tenderness or a Mass in the Umbilical Region.

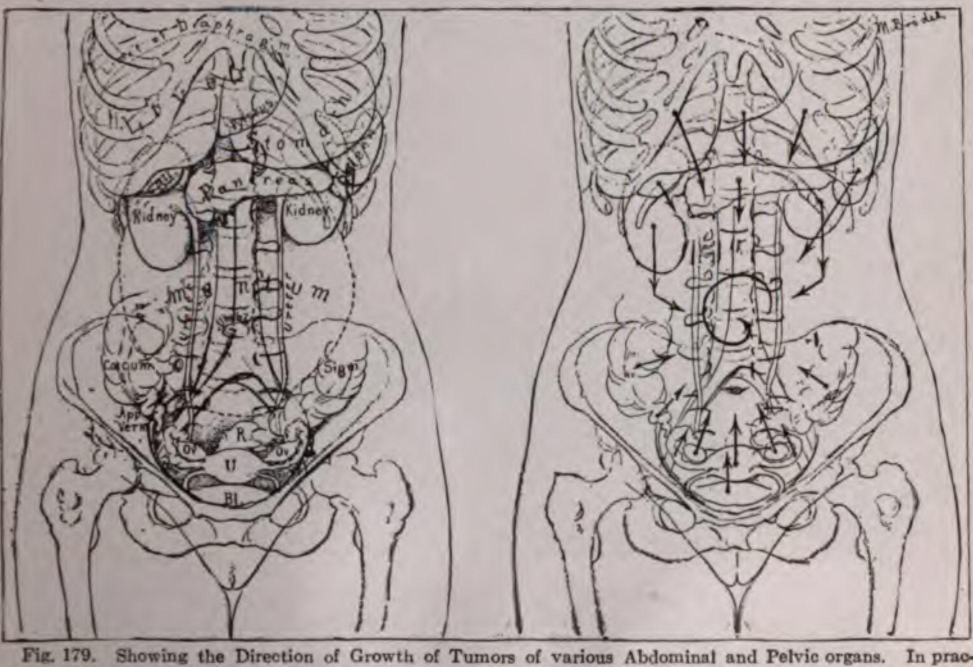


Fig. 179. Showing the Direction of Growth of Tumors of various Abdominal and Pelvic organs. In practically all cases, the direction of enlargement is toward the umbilical region. (Kelly—*Operative Gynecology.*)

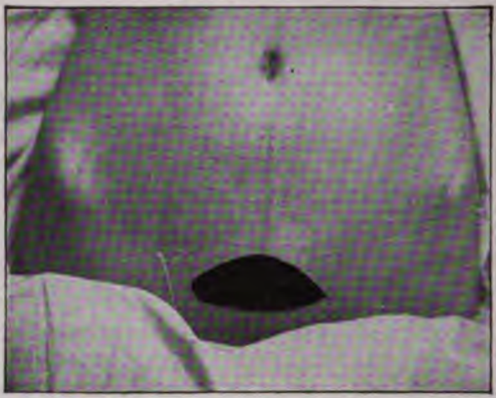


Fig. 180. Indicating the Area of Dullness due to moderate Distention of the Bladder.

Mass Felt in Left Upper Abdomen (Fig. 170).

Enlarged Spleen.
Tumor of Spleen.
Abscess of Spleen.

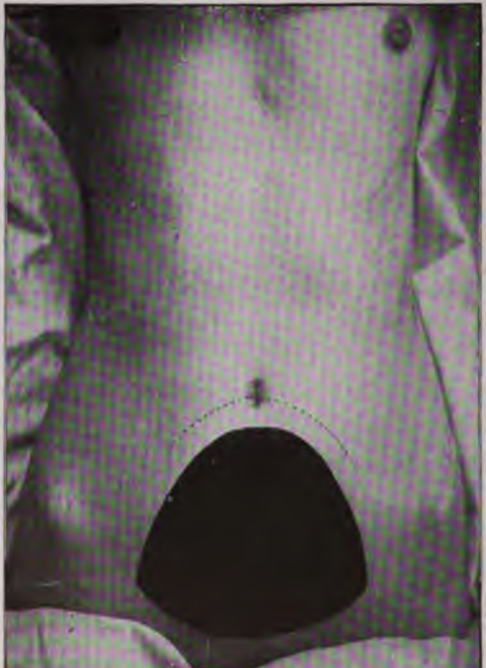


Fig. 181. Indicating the Area of Dullness from a large Mass of regular outline springing from the Center of the Pelvis, for example the pregnant uterus. The dotted line shows the upper limit of the mass as determined by palpation.

Tumor of Cardiac End of Stomach.
Tumor of Splenic Flexure of Colon.
Tumor of Kidney.
Abscess of Kidney.
Tuberculosis of Kidney.

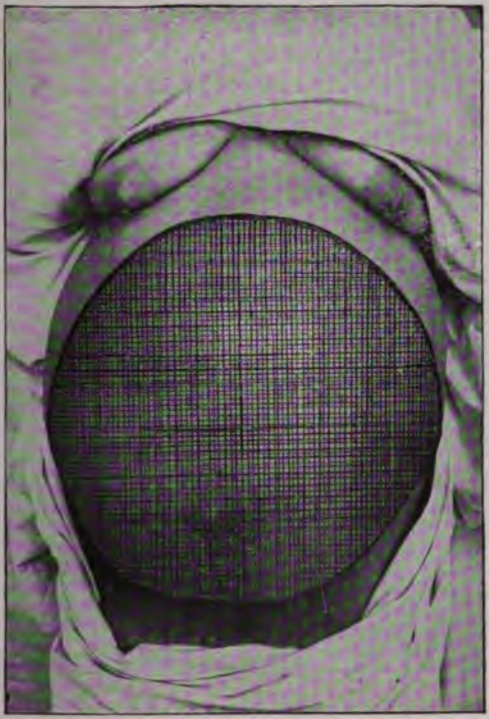


Fig. 182. Indicating the Area of Dullness from a Central Pelvic Mass which has enlarged to such an extent that it nearly fills the abdomen. Notice that the corona of resonance, surmounting the area of dullness, is symmetrical on the two sides. If the mass were lateral, for example, an ovarian or parovarian tumor, the area of resonance would be decidedly less on the side of the tumor than on the opposite side.

Mass Felt in Central Upper Abdomen (Fig. 172).

Tumor of Stomach.
Tumor of Left Lobe of Liver.
Fecal Impaction in Transverse Colon.
Tumor of Transverse Colon.
Tumor of Duodenum.
Tumor of Pancreas.

AREA OF DULLNESS IN ABDOMEN.

An area of dullness in the abdomen indicates that **something solid or fluid** is lying against the abdominal wall, pushing the intestines away or flattening out the intestine between the mass and the wall. When an area of dullness is found in percussing over the abdomen, the first thing to do is to **ascertain its exact outline.** The getting of the shape of the area clearly in mind is much facilitated by outlining it, wholly or partially, with a lead pencil or other marker. This outlining of the area shows what region or regions it is situated in, and also shows whether or not it is of such position and size and shape as would be likely to be caused by the enlargement of any adjacent organ. In some cases the employment of both superficial and deep percussion may aid some in differential diagnosis.

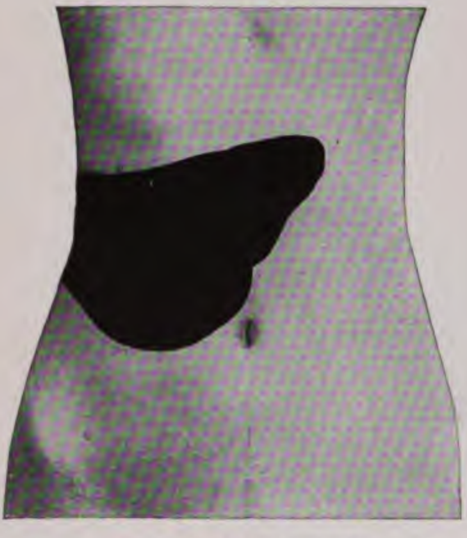


Fig. 183. Indicating the region for Dullness from Enlarged Liver.

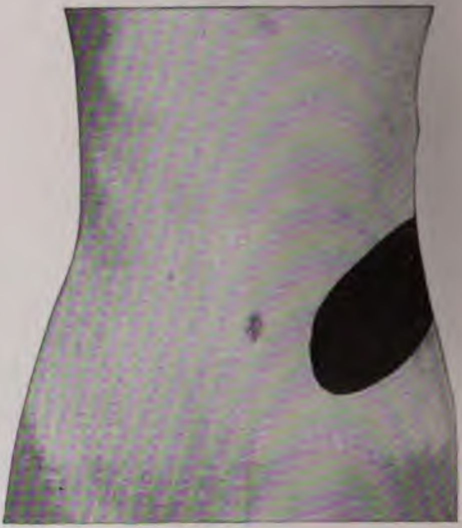


Fig. 184. Indicating the region for Dullness from Enlarged Spleen.

Then determine if the area of dullness can be **shifted by pressure**—by attempting to push about any mass that may be in the abdomen.

Then determine if the outline of the dullness **changes with the position** of the patient. For example, mark out the area with the patient lying on the back, then have her turn on one side and mark it in that position. Then have the patient stand, if she is able, and mark the outline of the dullness in that position. This is of much importance in the diagnosis of free fluid in the peritoneal cavity.

An **area of dullness** where there should be resonance **may be due to** any of the following conditions:—

An enlarged organ—for example, the bladder distended with urine (Fig. 180), a pregnant uterus or other median mass (Figs. 181, 182), the liver enlarged from various causes (Fig. 183) or the spleen enlarged from various causes (Fig. 184).

The dullness extends to the region normally occupied by the organ. It has about the shape to be expected in symmetrical or asymmetrical enlargement of the organ in question. There are other evidences of disease of that organ. There is nothing else found to account for the dullness. Each of these points should be considered when endeavoring to ascertain whether or not a mass is due to enlargement of some particular organ.

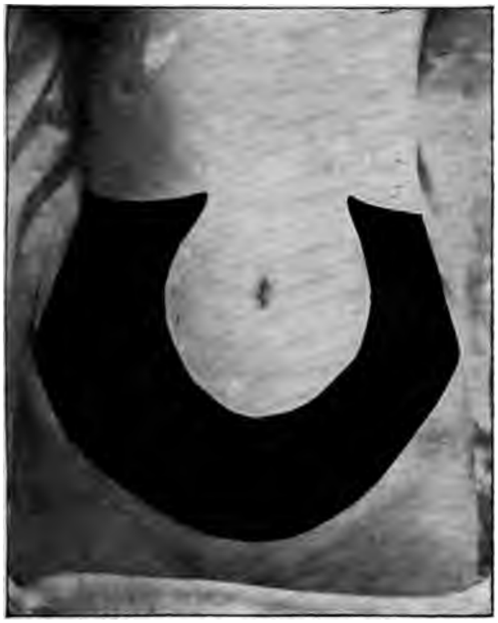


Fig. 185. Showing the Area of Dullness in moderate Ascites, with the patient lying on her back.

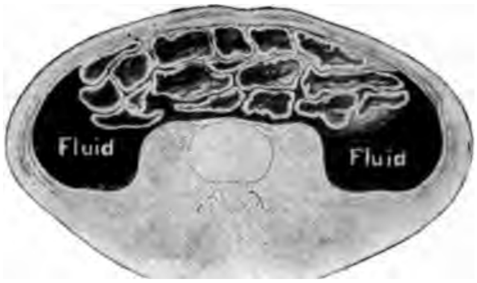


Fig. 186. Showing the reason for the disposition of the Dull and Resonant Areas in a case of moderate Ascites. (Butler—*Diagnostics of Internal Medicine.*)

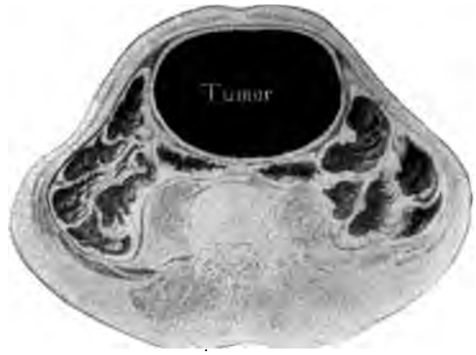


Fig. 187. Indicating the relation of the Dull and Resonant Areas in the case of a Tumor occupying the central lower abdomen. (Butler—*Diagnostics of Internal Medicine.*)

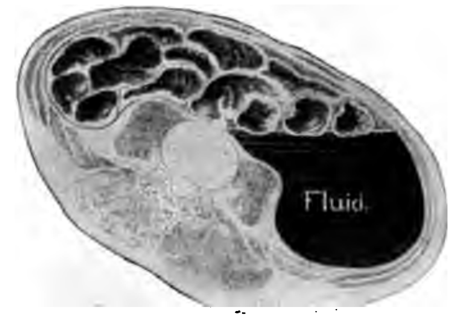


Fig. 188. Ascites. Representing the patient turned on one side. The fluid gravitates to the under side, leaving the upper flank resonant. (Butler—*Diagnostics of Internal Medicine.*)

Free Fluid in Peritoneal Cavity (Acites). In this condition the fluid of course seeks the lowest part of the peritoneal cavity, being drawn there by gravity, and the upper margin of the fluid, represented by the upper margin of the area of dullness, is approximately horizontal. As the patient changes position, the fluid changes its relative position, to conform to the law just given — hence the change in the outline of the area of dullness, which is so characteristic in these cases. To illustrate the application of this law, take a case of moderate ascites. With the patient on her back the dullness would be as re-

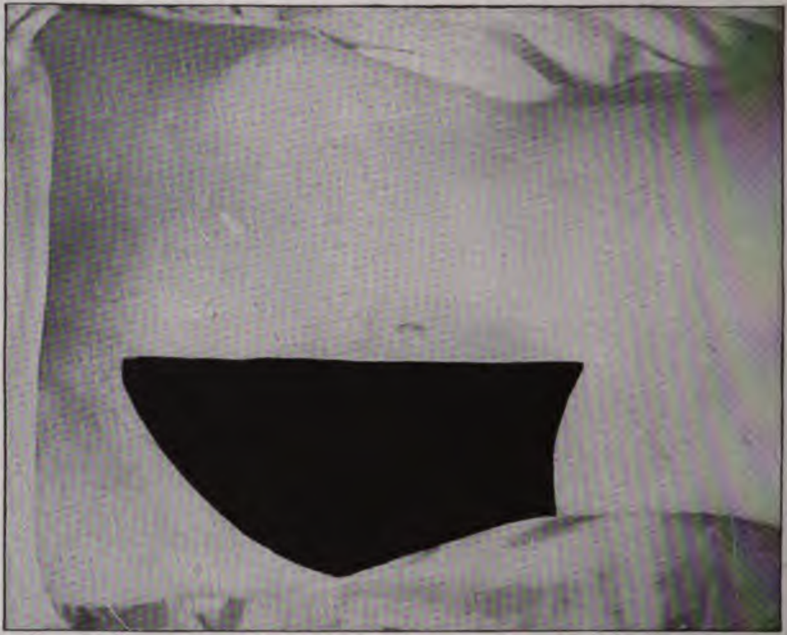


Fig. 189. Indicating the Area of Dullness in a case of moderate Ascites, with the patient turned on the left side.

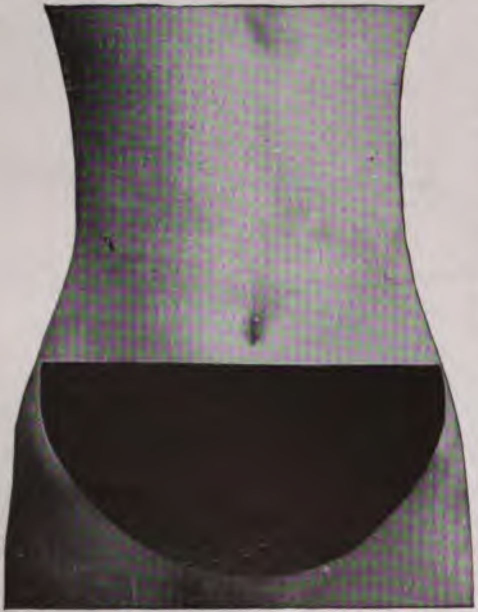


Fig. 190. Indicating the Area of Dullness in moderate Ascites, with the patient standing.

presented by the dark area in Fig. 185, with a corona of resonance about the umbilicus, which is the highest point. Fig. 186, which represents a cross section of the body in such a case, explains the cause of the dull and resonant areas. Fig. 187 shows the contrasting condition produced by a tumor, and the area of surface dullness produced by the same is indicated in Fig. 181. When the patient with ascites turns on her side, the fluid shifts as indicated in Fig. 188 and the area of dullness changes as shown in Fig. 189, the upper flank becoming resonant. When the patient stands, the fluid again shifts, seeking the lowest part, and the outline of dullness changes to that shown in Fig. 190. Notice that in all positions of the patient, the fluid occupies the lowest part of the peritoneal cavity, and the upper margin of the fluid is approximately horizontal. Of course the height of the area of dullness varies in different cases depending on the amount of fluid in the cavity. The illustrations already referred to indicate the dullness in the cases of ascites of moderate severity. If there is only a small amount of fluid in the cavity, there may be only a small area of dullness appreciable in each flank, as the patient is lying on her back. When the patient turns on the side, the area of dullness increases appreciably in the lower side and disappears entirely in the upper flank. When the patient stands, there may be a small area of dullness in lower abdomen just above the pubes, or there may be no dullness appreciable anywhere in the abdomen, because the amount of fluid is so small that it is all concealed in the depth of the pelvic portion of the peritoneal cavity. On the other hand, in exceptional cases the amount of fluid is so great that it fills the peritoneal cavity and raises the abdominal wall above the intestines (higher than the mesentery will permit the intestines to float), giving dullness about the umbilicus as well as elsewhere. This does away with the corona of resonance about the umbilicus, which is so characteristic a feature of ordinary ascites.

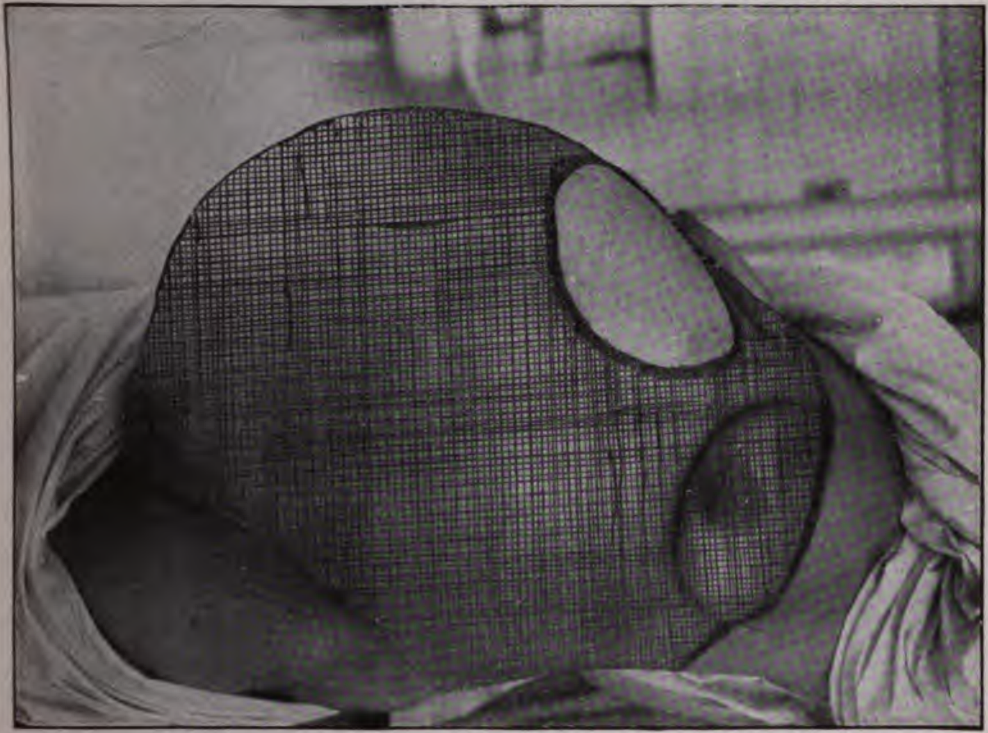


Fig. 191. A case of Extreme Ascites. Same patient as shown in Fig. 135. Showing the Area of Dullness when the patient is on her Back. The light area is all that is resonant.

135 shows a patient sent to me with a supposed ovarian cyst. The general

appearance was very much like that of a cyst distending the abdomen.
area about the umbilicus was dull, excluding ordinary ascites. In percussing
fully over the whole abdomen, however, I found an area of resonance in the
upper abdomen. Fig. 191 shows the outline of this area when the patient
lying on her back. Fig. 192 shows the outline of the area of resonance whe
patient was standing. A comparison of these two areas (Fig. 193) showed
there was decided variation in the area of dullness with the change of pos

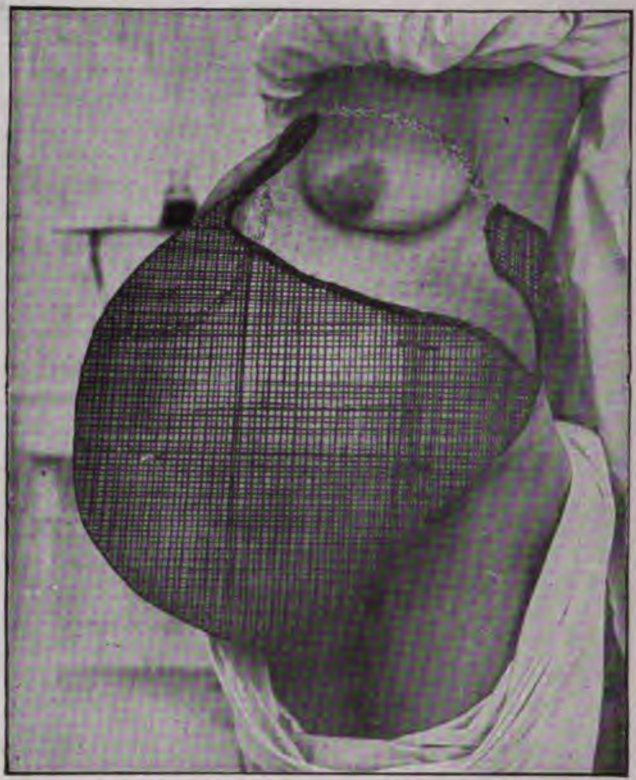


Fig. 192. Extreme Ascites. Area of Dullness with patient Standing. Same patient as shown in Fig. 191. Notice the marked change in the resonant area. The upper limit of the dullness is now almost horizontal. The former marks have not been completely removed.

without any important change in the general shape of the abdomen, a cond
that could be caused only by free fluid in the peritoneal cavity. As the pa
stood, there was distinct bulging of the umbilicus (Fig. 138) and distinct flu
tion through the thin umbilicus. There was present also edema of the abdo
wall. On vaginal examination, no tumor was felt in the pelvis. These signs
considered sufficient to exclude ovarian cyst, and I sent the patient back t
physician with a diagnosis of ascites. As there was no decided kidney di
or heart lesion, the marked ascites was supposed to be of hepatic origin, w

diagnosis was confirmed by the women's death from sudden gastric hemorrhage and by the partial post-mortem examination, the details of which were kindly given me by her physician.

Figs. 136 and 137 show other cases in which the amount of ascitic fluid was so great that the abdominal wall was raised above the intestines, and the corona of resonance about the umbilicus was consequently absent.

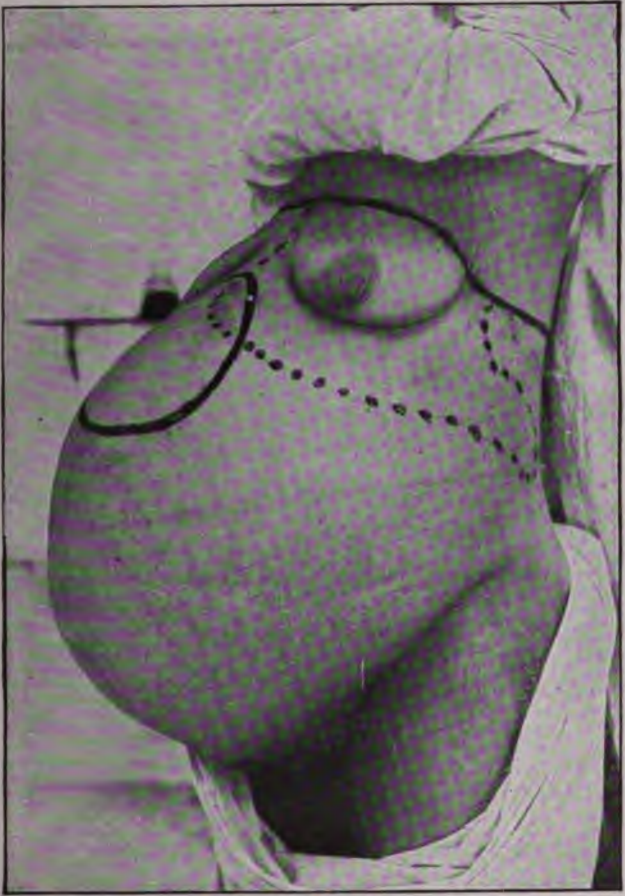


Fig. 193. Extreme Ascites. Same patient as shown in Fig. 191. The Two Resonant Areas contrasted. The area enclosed by the solid line is resonant when the patient is on her back, while all elsewhere is dull on percussion. The area enclosed by the dotted line is resonant when the patient stands, while all elsewhere is dull. The change of outline of the dullness on change of posture, is clearly marked.

Again, ascites may be associated with an abdominal tumor, either as a complica- on or from some intercurrent disease. In either case, the association of the two indicated by the outline of the area of dullness with the patient in different is. Fig. 118 shows a patient presenting obesity and a fibroid tumor and ascites. The obesity was very apparent on inspection. On palpating, to determine if there were any further causes for the prominent abdomen, I found that there was a distinct mass extending upward from the pelvis into the central abdomen. Nothing more was found on palpation, except considerable tenderness over the tumor. Passing to percussion of the abdomen, with the patient lying on her back there was dullness over the mass extending, in the median line, to a short distance above the umbilicus and extending symmetrically to each side. In trying to determine accurately the area of dullness in the left side, I found that it extended horizontally along the flank as shown in Fig. 194. Percussion in the right flank showed about the same area of dullness there. The patient was then directed to stand and percussion was again employed. When standing, the area of dullness was as shown in Fig. 195. A comparison of these two outlines (Fig. 196) makes it plain that there was an unchanging area of dullness (due to the tumor) and a changing area of dullness, due to free fluid in the peritoneal cavity (ascites).

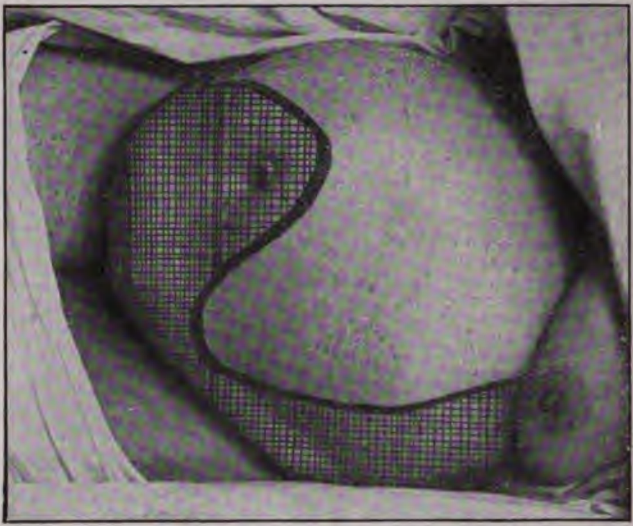


Fig. 194. A case of Ascites and Tumor. Same patient as shown in Fig. 118. Showing the Area of Dullness with patient on her Back. The central dullness is caused by the tumor and the lateral dullness by ascitic fluid. The dullness is practically the same on the two sides.

Encysted Fluid. This may be serum or ordinary pus or tubercular pus. There is dullness over the mass and resonance elsewhere (Figs. 197, 198). There is no change in the outline of the dullness on change of position of the patient, such as occurs with free fluid.

A rather rare condition of special interest coming under this category is the pseudo-cyst of the lesser omental cavity. An encysted collection of fluid occupying the cavity occasionally appears several weeks or months following an abdominal injury. Injuries so resulting are supposed to have involved the pancreas, it being held that the collection of fluid in the lesser omental cavity is due to the irritation from pancreatic fluid, which found its way from the damaged pancreas into the cavity mentioned. The small opening that leads from this lesser peritoneal cavity into the greater peritoneal cavity (foramen of Winslow), becomes closed in the beginning of the trouble and the fluid is confined within the lesser cavity. As this cavity lies back of the intestines, the mass of encysted fluid is partially covered by intestinal resonance, presenting the characteristic percussion signs of a retro-intestinal mass.

Tumor from the Pelvic Organs. The tumor may be solid or cystic. It may be situated in the center or laterally or may fill the whole abdomen. There is dullness over that portion of the mass lying against the abdominal wall and resonance elsewhere, unless there is associated ascites. There is no decided change of outline of the dullness with change of position of the patient. The growth may spring from the uterus (Fig. 199) or from the ovary or broad ligament. The latter growths are usually situated well to one side at first but later may fill the whole lower abdomen. Usually in such a growth there is still a corona of [illegible] surrounding the upper part of the growth and extending well into each

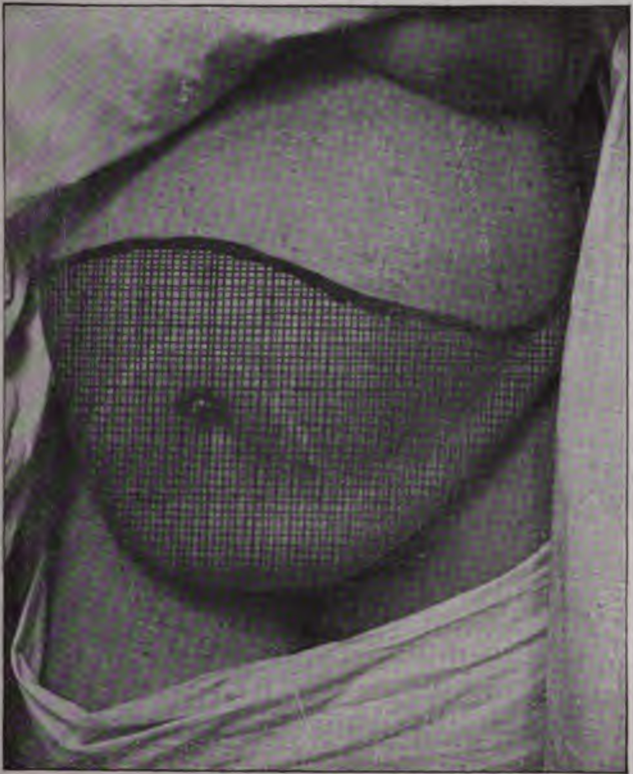


Fig. 195. Ascites and Tumor. Area of Dullness with patient Standing. Same patient as shown in Fig. 194. Notice the marked change in the upper limit of the dullness. It is now almost horizontal. The former marks have not been completely removed.

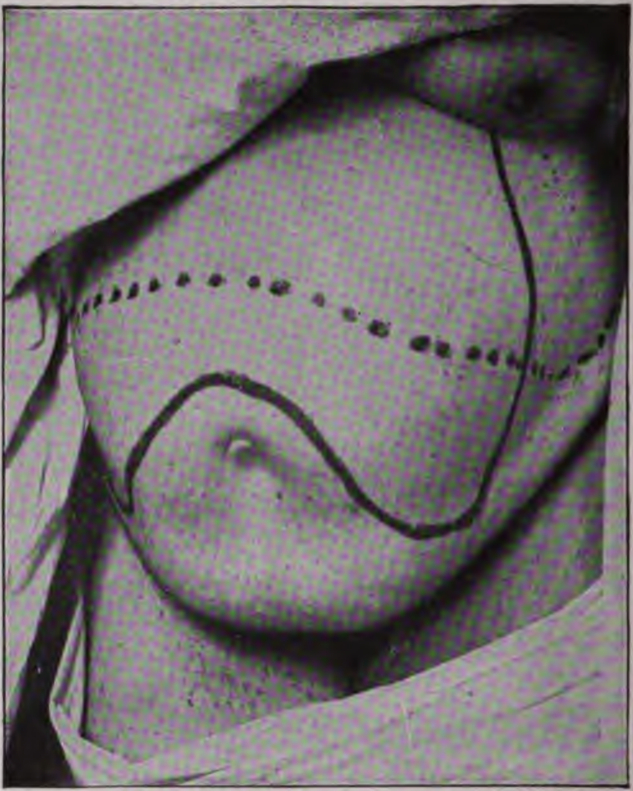


Fig. 196. Ascites and Tumor. Same patient as shown in Fig. 194. The Two Areas Contrasted. The solid line shows the border of the dull area when the patient is on her back and the dotted line when she is standing. The change of outline of the dullness on change of posture is very evident, making it beyond doubt that, whatever other abnormal condition there may be in the abdomen, there is certainly free fluid Notice also that as the patient stands the upper margin of the dull area (dotted line) is approximately horizontal.

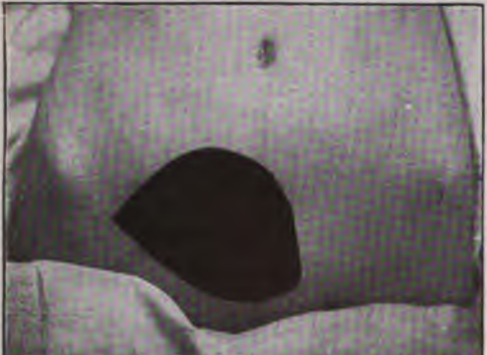


Fig. 197. Indicating the situation of the Area of Dullness due to a large Inflammatory Mass or a small Tumor arising from the right Tubo-ovarian region.

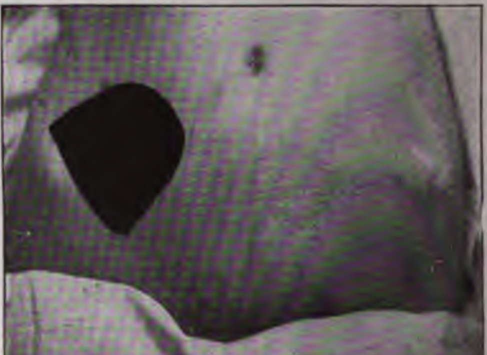


Fig. 198. Indicating the situation of the Area of Dullness due to an Inflammatory Mass arising from the Appendix or Caecum.

flank. In other cases the tumor grows into the flank and crowds the intestines upward and into the opposite flank. In such a case there is dullness over all the front of the abdomen and also in one flank, there being resonance in the opposite flank only (Fig. 200). There is no change of the outline of resonance with change of position of the patient, the distinct resonance in the opposite flank remaining even when the patient is turned well over on that side, provided there is no complicating ascites.

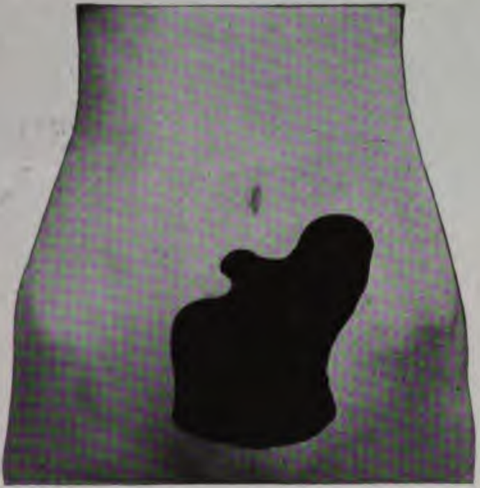


Fig. 199. Indicating the Irregularity and grotesqueness of form often presented by the Dull Area in Uterine Fibromyomata.

Tumor from some abdominal organ. There is dullness over that portion of the mass lying against the wall and resonance elsewhere, unless there is associated ascites. Such a tumor may spring from the liver or from the spleen oı from some part of the gastro-intestinal track. The usual sites for tumors in the digestive track are the pyloric end of the stomach, the caecum and the sigmoid flexure of the colon.

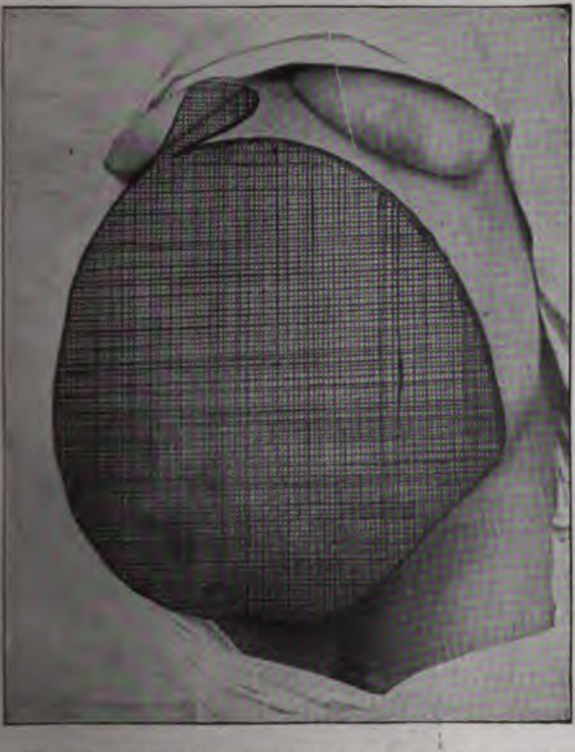


Fig. 200. Indicating the outline of the Area of Dullness in a case of large of Ovarian Cyst from the right side, the tumor having become so large that it has crowded the intestines out of the right flank, and its dull area joins with that of the liver. The left flank is resonant and remains so in all postures.

Tumor of some Retro-intestinal Structure. The characteristic feature of retroperitoneal masses (either inflammatory masses or new growths) is that there is intestinal resonance in front of them. When the growth reaches a large size the intestines are usually pushed aside over a considerable area, so that a part of the palpable tumor mass shows dullness and a part shows

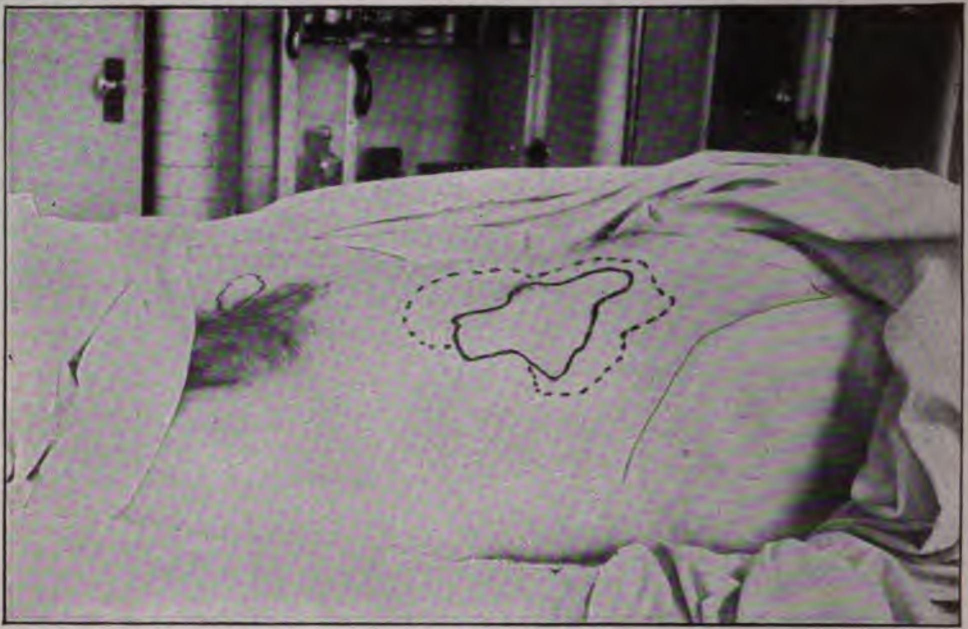


Fig. 201. The Area of Dullness in a Retroperitoneal Growth. Same patient as shown in Fig. 146. (Dr. Elsworth Smith's patient). The area enclosed by the solid line is dull on percussion. The dotted line shows the outline of the growth as determined by palpation.

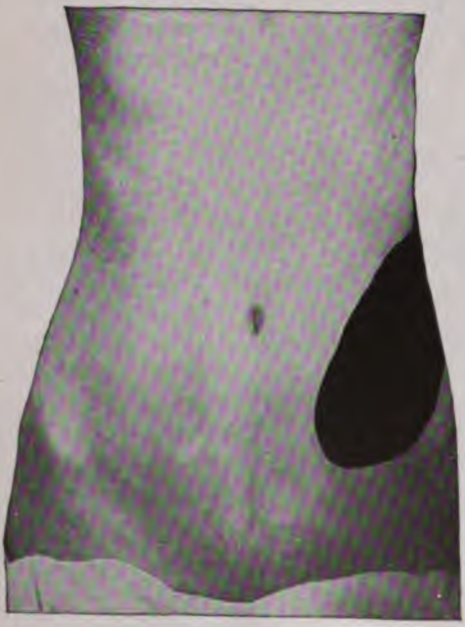


Fig. 202. Indicating the Area of Dullness in the case of Kidney Tumor, before inflation of the colon.

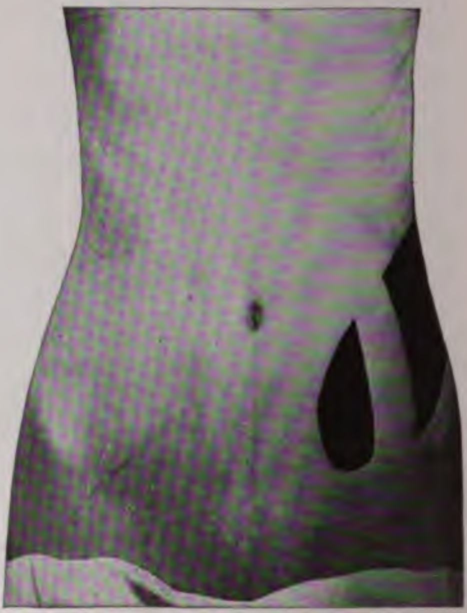


Fig. 203. Indicating the Area of Dullness in the case of Kidney Tumor, after inflation of the colon.

intestinal resonance. Fig. 201 shows such an abdominal growth. The size of the palpable tumor is indicated by the dotted outline and the area of dullness is surrounded by the solid line. Inflation of the stomach in this case caused the area of dullness todisappear almost entirely, showing that the growth sprung from some structure back of the stomach cavity. A retro-intestinal tumor may spring from the pancreas or from the mesenteric glands or from the retro-peritoneal glands or adjacent structures or from the kidneys or suprarenal glands. A kidney tumor not infrequently forms a large mass extending from the lumbar region towards the pelvis and the median line. The characteristic percussion sign of a kidney growth, or other retro-peritoneal growth in that region, is that the colon

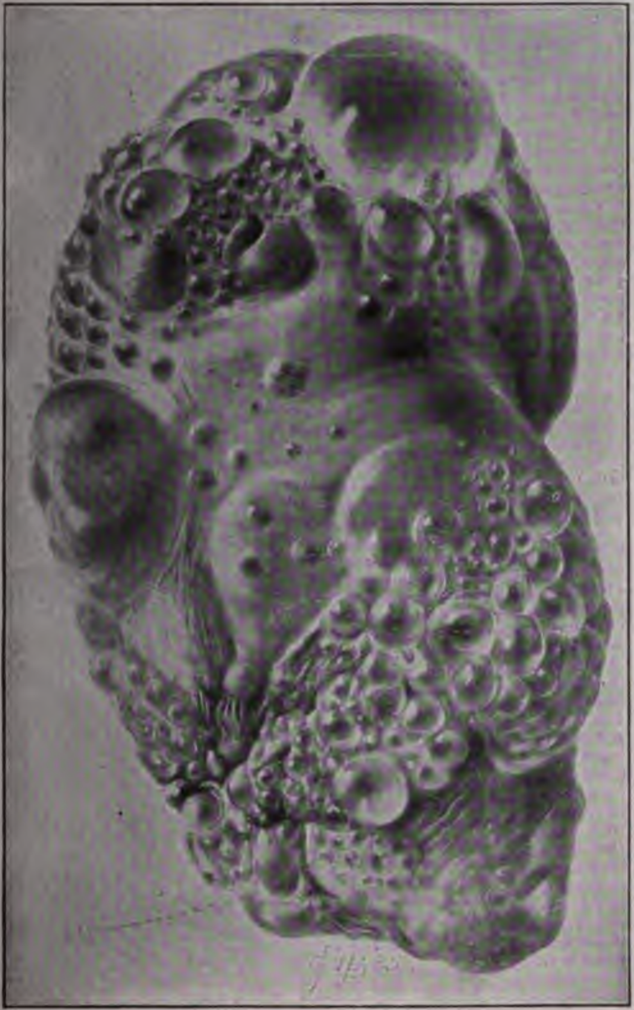


Fig. 204. The Kidney Tumor itself after removal, in the case presenting the signs shown in Figs. 202 and 203.

resonance can be made out in front of it. When the growth is large, the colon may be flattened out by compression between the tumor and the abdominal wall, and in that case no colon resonance would be obtained in the ordinary examination. But the colon resonance can be easily brought out by inflation of the colon with air, introduced through a rectal tube by means of the ordinary double-bulb or an atomizer bulb. This point is well illustrated by the following case. Mrs. M. was sent to me for operation for a fibroid tumor of the uterus. There was a large mass lying in the left lower abdomen, easily palpable and extending to the uterus. Superficially it presented the appearance of a pediculated subperitoneal fibroid. On deep palpation, however, this prominent mass was found to be connected with a deeper mass which extended up into the lumbar region. By manipulation the whole mass could be displaced upward somewhat, sufficiently to show that its point of origin was probably in the left lumbar region and not in the pelvis. When the tumor was displaced upward, the vaginal and abdominal fingers, in the vagino-abdominal examination, could be made to meet between the mass and the uterus, and no pedicle connecting the two could be felt. The diagnosis then lay between a kidney tumor and an enlarged spleen. The palpable portion of the mass did not have the characteristic shape of either the kidney or the spleen, but it approached nearer the shape of the spleen. There were no kidney symptoms. Percussion showed dullness all over the mass (Fig. 202) — there was no colon resonance. But the mass was more deeply placed than an enlarged spleen usually is, and the upper end seemed to extend directly into the kidney region. So I inflated the colon in the office examination, and the colon resonance

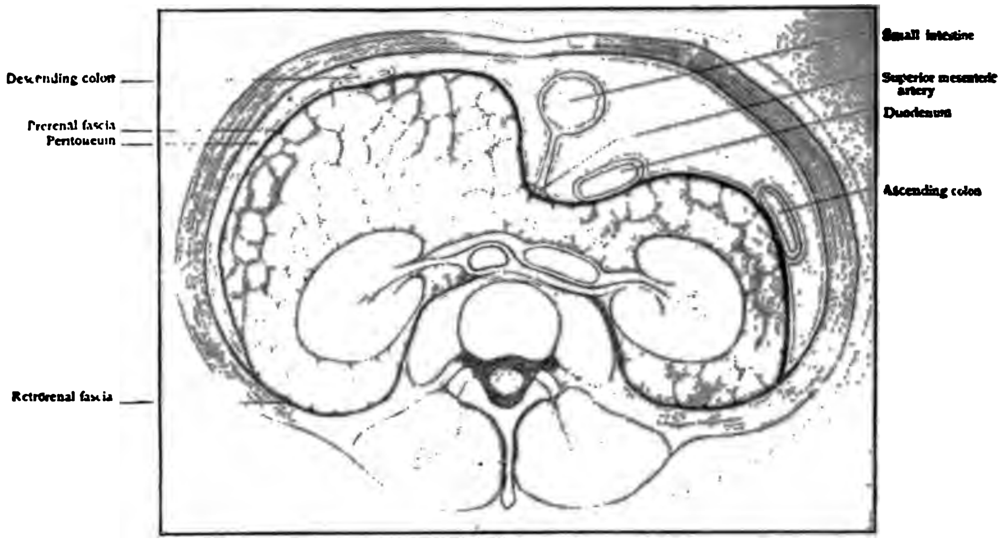


Fig. 205. A case of Peri-renal Lipoma—another form of Retroperitoneal Tumor. (Edward Reynolds—*Annals of Surgery.*)

once stood out well on percussion (Fig. 203), demonstrating that the mass s back of the colon and therefore probably a kidney growth. The correctness the diagnosis was proven at the operation. Fig. 204 shows the mass, which s a cystic tumor of the kidney. The growth was so large that it was neces- ry to remove it by transperitoneal nephrectomy. The entire absence of kidney

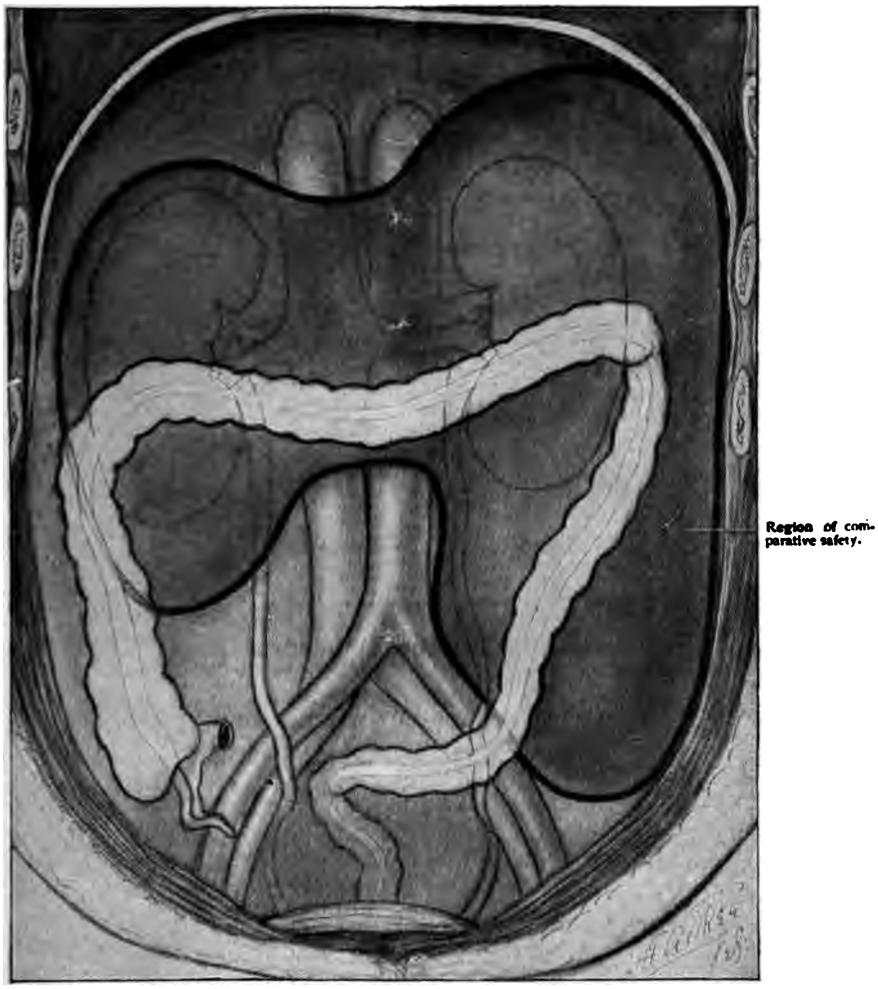


Fig. 206. Peri-renal Lipoma. Same case as Fig. 205. A view from in front, showing an approximate outline of the tumor and the possible area of dullness, and also how the colon could be made to stand out resonant by inflation. Also, the "region of comparative safety" for beginning enucleation of the tumor, is indicated. (Edward Reynolds—*Annals of Surgery*.)

bladder symptoms was due to the fact that the left kidney was totally destroyed d had not been secreting, all the kidney work being done by the right kidney. A rare and interesting form of retroperitoneal growth is the retroperitoneal oma, which usually has its origin in the peri-renal fat.

It may grow extensively in various directions and in some cases become so large that it fills the abdomen, pushing the intestines aside or flattening them out on its surface. Edward Reynolds, of Boston, reported a very extensive tumor of this kind. The size and location of the mass and the area of percussion-dullness are shown by Figs. 205 and 206, which are from his article. He was able to collect forty-nine cases from literature.

Tumor or Inflammatory Mass in Abdominal Wall. This may give rise to dullness on superficial percussion or even on moderately deep percussion. But very deep percussion will show some resonance all over, except in cases where the mass is so extremely large that the diagnosis is plain from other signs. Fig. 124 shows a growth situated in the abdominal wall.

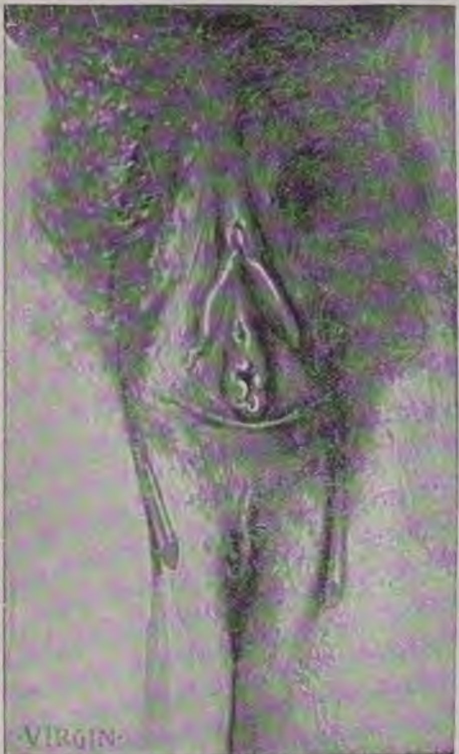


Fig. 207. External Genitals of a Virgin. Photograph from a cadaver. (Dickinson—*Am. Text-book of Obstetrics.*)

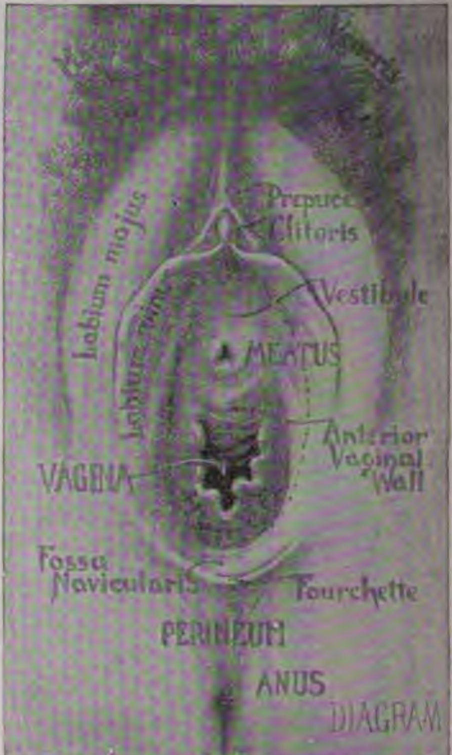
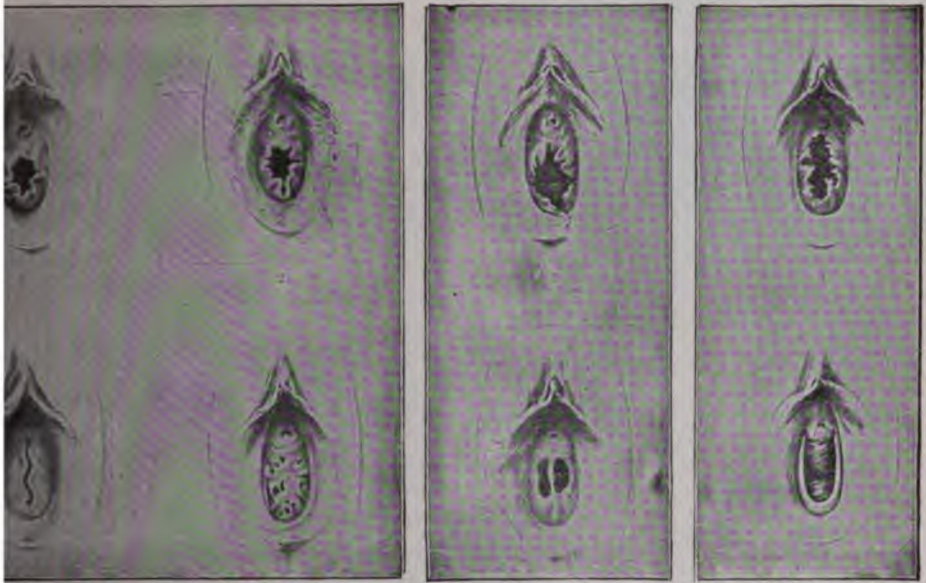


Fig. 208. Diagrammatic representation of the External Genitals of a Virgin. (Dickinson—*Am. Text-book of Obstetrics.*)

POINTS IN THE EXAMINATION OF EXTERNAL GENITALS.

The appearance of the external genitals in the virgin are shown in Fig. 207. The same structures are shown diagrammatically and with names on the parts in Fig. 208. The appearance of the hymen differs much in different cases, as indi-



09, 210, 211. Showing the various forms of Hymen. (Dickinson—*Am. Text-Book of Obstetrics.*)

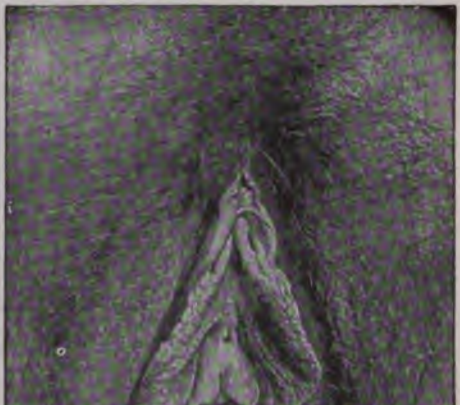


Fig. 212. External Genitals of a Married Woman. (Dickinson—*Am. Text-Book of Obstetrics.*)

ı Figs. 209, 210, 211. In the married
the vaginal opening is larger and
le and the labia minora are better
, being much larger and considerably
ited (Figs. 212, 213). When the pa-
as had children, the hymen is ordi-
lestroyed and the vaginal opening is
rger. In some cases when the labia
read apart for the examination the
may be traced out in its entirety,
reaks here and there from the tears
r. In other cases, the torn portions
een largely destroyed by pressure
the labor and there remains only an
nal tag of tissue along the vulvo-va-
unction. These irregular tags of tis-
onstitute the "carunculae myrti-
" The corrugated condition of the
minora is shown in Fig. 213, in which
nitals have been shaved as for opera-
The relations of the urethral opening
margin of the vaginal opening and to
ia are exceptionally well shown in
4, in which the operating speculum is
e. Fig. 215 gives a clear idea of the
ance when there is moderate lacera-
the perineum.

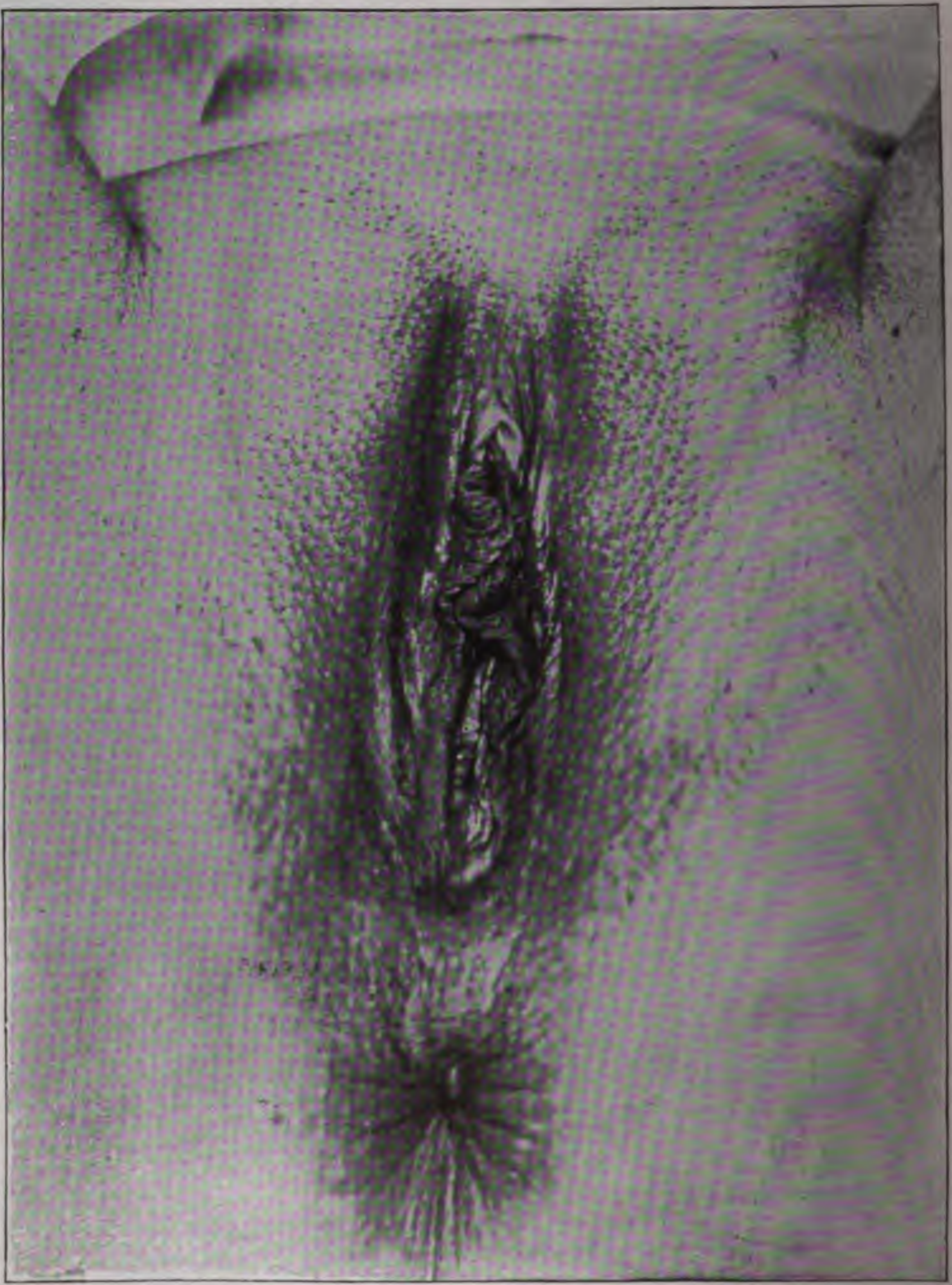
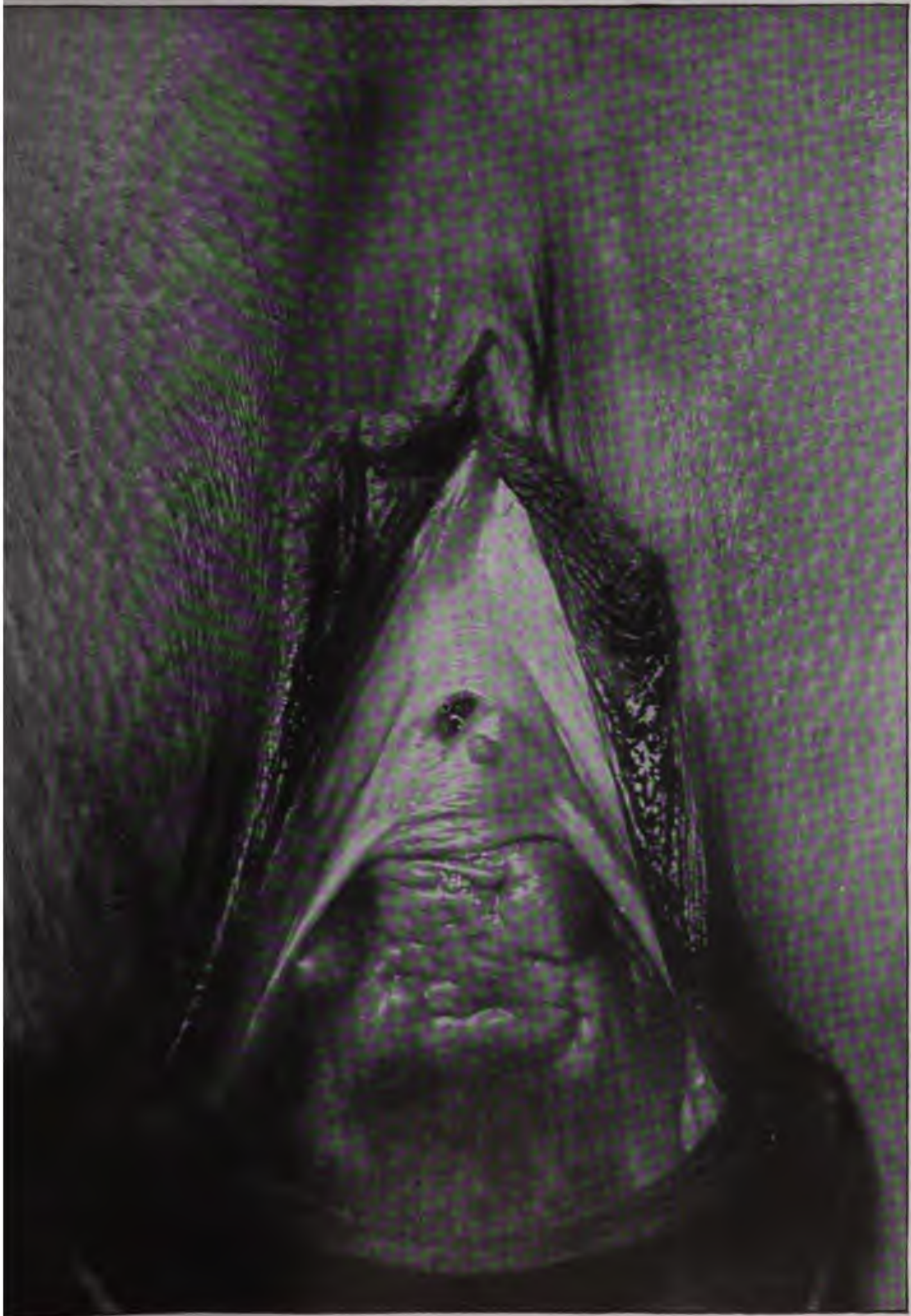


Fig. 213. Genital region shaved as in preparation for operation, showing the relation of the various structures. The corrugations of the labia minora are well shown.



34. This photograph was taken with the camera very close to the patient and with the ng speculum in place. The Relations of the Urinary Meatus and the Labia Minora and ginal Opening are well shown.

DISCHARGE ABOUT EXTERNAL GENITALS.

As explained in chapter I, there is normally a slight discharge about the external genitals, sufficient to keep the parts moist.

Abnormal discharge may be only an increase in the normal muco-epithelial discharge or it may be muco-purulent or purulent or watery or bloody. The various kinds of discharge are conveniently considered under the two terms, leucorrhoea and bloody discharge.

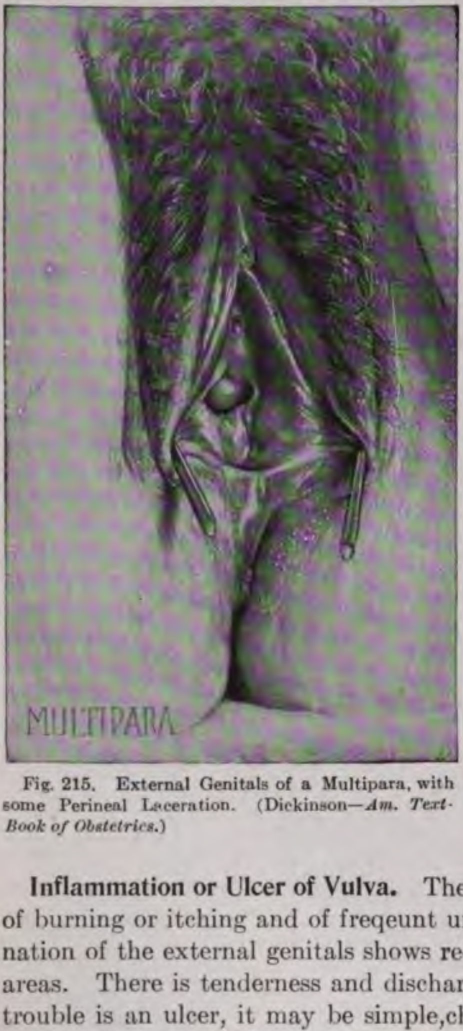


Fig. 215. External Genitals of a Multipara, with some Perineal Laceration. (Dickinson—*Am. Text-Book of Obstetrics.*)

Leucorrhoea.

Under this term I include all varieties of pathological discharge from the genitals, except discharge containing blood.

Regarding leucorrhoea due to extra-genital disturbances only, that is hardly probable, as the leucorrhoea in itself is evidence of local disturbance. There are, however, certain cases in which the functional ditsurbance, evidenced by the leucorrhoea, is dependent largely on malnutrition or on pelvic congestion from extra-genital causes. The mild leucorrhoea found in the anemic or cachetic, may disappear when the patient is put in good general health. Again, in pelvic congestion from heart disease or from some general cause, there may be present a mild leucorrhoea which disappears when the functional pelvic congestion is corrected. In this sense, leucorrhoea may be said, in some cases, to be due to extra-genital causes and its relief to depend on treatment of the same. In all but exceptional cases, however, leucorrhoea is due to one or more of the following local conditions:

Inflammation or Ulcer of Vulva. There is a history of discharge from the vulva, of burning or itching and of freqeunt urination with perhaps some pain. Examination of the external genitals shows redness, either general or localized to certain areas. There is tenderness and discharge and also evidence of the cause. If the trouble is an ulcer, it may be simple,chancroidal, syphilitic, tubercular or malignant. Further examination shows no discharge from the vagina and no evidence of trouble there.

Acute Vaginitis. There is a history of a free yellow discharge of short duration, irritation of vulva and frequent urination with some burning. Examination shows a yellow discharge and redness of vulva. If gonorrhoeal, there is usually involvment of vulvo-vaginal glands, also the discharge shows gonococci. The vaginal walls are rough and hot and tender—too tender to admit of satisfactory bimanual examination. When exposed with the speculum, the vaginal walls are reddened, and there is not enough discharge from the cervix to account for the leucorrhoea.

Chronic Vaginitis. This occurs principally in children. There has been a yellow discharge for several weeks or months, with irritation of the vulva and some bladder irritability. Examination shows a yellow discharge and some redness of the vulva, with more or less tenderness. The discharge should be examined for gonococci. If the patient is a child, no vaginal examination is made. If an adult, examination shows tenderness and chronic thickening and roughening of vaginal walls, usually most marked in the posterior fornix. Speculum examination shows redness of the vaginal walls, either generally or in patches, and there is not enough discharge from the cervix to account for the leucorrhoea.

Adhesive Vaginitis. This occurs principally near or after the menopause. There is a history of chronic discharge, with irritation of the vulva and sometimes bladder irritability. On examination it is found in most cases that the discharge is slight and is sticky or "gluey" in character, though in exceptional cases it is free and purulent. In some cases there are scratch marks, resulting from the patient's attempts to overcome the pruritus. On vaginal examination, the vaginal walls are found adherent in spots, especially at the upper part of the vagina. If the adhesions are recent, they separate easily with some bleeding. If the adhesions are old, they are firm and in some cases the vagina is almost obliterated by the process. When the walls are separated with the speculum, in the less advanced cases, irregular spots which are raw and bleed slightly may be seen.

Ulcer of Vagina. This may be simple, chancroidal, syphilitic, tubercular or malignant. There is a history of an acute or chronic discharge, and probably also of other evidences of the disease causing the ulceration. Examination shows a discharge about the vulva and more or less irritation of the surfaces. When making the vaginal examination, the indurated edges or base of the ulcer may be felt. The speculum exposes the ulcer to view, and further investigation shows it to be the sufficient cause of the discharge.

Acute Endocervicitis. There is a history of a tenacious, stringy discharge, of recent origin. There may or may not be irritation of the external genitals. Vaginal and bimanual examination show nothing special. Speculum examination shows a stringy tenacious discharge coming from the external os. There is also congestion of the cervix and usually erosion about the external os.

Chronic Endocervicitis. There has been a discharge for a long time. Vaginal and bimanual examination show no evidence of involvement of the corpus uteri or the adnexa. Speculum examination shows a very tenacious, stringy mucopurulent discharge from the external os, with more or less surrounding erosion. In many cases there has been also severe laceration of the cervix, the evidences of which may be felt and seen.

Laceration of Cervix. In these cases, the discharge is due not so much to the tear itself as to the subsequent eversion and irritation and chronic inflammation.

The various appearances presented by the lacerated cervix are shown later in this chapter, under "Points in the Speculum Examination."

Ulcer of Cervix. Such an ulcer may be simple, chancroidal, syphilitic, tubercular or malignant. There is a history of leucorrhoea. In the vaginal examination the ulcer of the cervix may or may not be felt, depending on whether or not there is any induration in the edges or base. When the cervix is exposed with the speculum, the ulcer is seen, presenting a distinctly-marked margin, and a base of granulation tissue (epithelial covering entirely lost).

Malignant Disease of Cervix. This may appear in the form of an ulcer, with indurated margins and base, or as a papillary growth from some spot on the cervix or within the cervix. For the various appearances of beginning malignant disease of the cervix, see under "Points in the Speculum Examination" in the latter part of this chapter and see also chapter IX.

Polypi of Cervix. Polypi of the cervix, of various kinds, may give rise to considerable leucorrhoea, though usually a bloody discharge is the prominent feature in these cases.

Acute Endometritis, whether gonorrhoeal or due to pus infection following labor or miscarriage, gives rise to free discharge. There is a history of recent labor or miscarriage or instrumentation or gonorrhoea, or a history of chronic endometritis due to one of these causes. Examination shows a free discharge, the character of which points to the cause of the trouble, as explained in chapter VI. Vaginal and bimanual examination show tenderness of the body of the uterus, but no tenderness around the uterus, unless there is complicating trouble. Speculum examination shows a free purulent or sanguino-purulent discharge coming from the uterus.

Chronic Endometritis. There is a history of chronic leucorrhoea. Examination shows nothing in the vagina or cervix to account for the discharge. The body of the uterus may be somewhat enlarged or tender, though not necessarily so. Through the speculum, it is seen that the discharge comes from the uterus and not from inflammation of the vaginal walls. The character of the discharge indicates that it comes largely from the endometrium and not from the cervical glands.

Retro-displacement of Uterus causes leucorrhoea by causing persistent congestion of the endometrium, resulting in a chronic endometritis.

Fibroid of Uterus causes leucorrhoea by causing chronic irritation of the endometrium, both by direct pressure and by interference with its blood supply.

Cancer of Corpus Uteri causes leucorrhoea by the breaking-down of the cancerous area, and also by the chronic irritation of the adjacent endometrium.

Peri-uterine Disease causes leucorrhoea by causing chronic congestion of the endometrium, with resulting chronic endometritis.

Functional Congestion of the uterus or pelvis, causes leucorrhoea by causing the nutritive or so-called inflammatory changes in the endometrium and cervical mucosa.

Bloody Discharge From Genitals.

Bleeding, not connected with menstruation, may vary from a streak of blood, or a slight coloring of a muco-purulent discharge, to a free flow of blood there is a hemorrhage sufficiently free to threaten the patient's life. In most cases however the bloody discharge is slight and irregular, and is of serious import only because it may have a serious condition for its cause.

Any of the following diseases may cause a bloody discharge from the genital tract, the character of the discharge varying from a muco-purulent discharge only slightly streaked with blood, to a profuse flow of blood and clots.

All the conditions mentioned in the first part of the list give rise also to leucorrhoea and are mentioned under it (pages 177, 178). The other conditions occur with pregnancy and must be thought of whenever a bloody discharge is present.

Inflammation or Ulcer of Vulva, particularly malignant ulcer.

Acute Vaginitis.

Chronic Vaginitis.

Adhesive Vaginitis.

Ulcer of Vagina.

Acute Endocervicitis.

Chronic Endocervicitis.

Laceration of Cervix.

Ulcer of Cervix.

Cancer of Cervix.

Polypi of Cervix.

Acute Endometritis.

Chronic Endometritis.

Retro-displacement of Uterus.

Fibroid of Uterus.

Cancer of Corpus Uteri.

Peri-uterine Disease.

Functional Congestion.

Threatened Miscarriage. The patient may have missed the menses only a few days or she may be several months pregnant. Threatened miscarriage is usually accompanied by considerable pelvic pain. In exceptional cases there may be bloody discharge for several hours or a day or two, before pains begin. In some cases by questioning the patient, it will be found that, failing to come unwell at the proper time, she has been taking medicine to "bring on the flow" (produce an abortion).

Miscarriage. Here there are sharp cramp-like pains, with the expulsion of blood-clots and pieces of membrane or a formed fetus, depending on the period of pregnancy at which the accident happens. Then the pain subsides and after a few days the bloody discharge ceases.

Incomplete Miscarriage. The uterus is not entirely emptied and the retained remnants cause a persistent bloody discharge for one or two weeks after it should have stopped, and there is also resulting subinvolution of the uterus. The blood may pass as a muco-sanguinous discharge or in clots. It may disappear when the patient stays in bed, to reappear when she gets up. This is probably the most frequent cause of persistent bleeding in women of the child bearing age. There is [illegible] scarriage has taken place. The principal symptom is the bleeding, with the resulting anemia and weakness. If infection takes place, the symptoms of sepsis are added.

Placenta Praevia. Bleeding from this cause does not usually take place until the pregnancy has advanced so far that the diagnosis is perfectly clear.

Laceration of Cervix with Pregnancy. The cervix is lacerated and everted and eroded, and there is added the softening and congestion from pregnancy. There are no pains such as accompany miscarriage. There may be some slight pain or uneasiness in pelvis, which is relieved by lying down. The bloody discharge persists, off and on, without apparent evidence of threatened miscarriage or other intra-uterine disturbance.

Tubal Pregnancy. The rupture of a tubal pregnancy, or a tubal abortion, is nearly always followed in a few days by an irregular bloody discharge, which may persist for several days or several weeks. In some cases, pieces of membrane are associated with the bloody discharge. There are also the other evidences of tubal pregnancy (see chapter XI).

INFLAMMATION OF EXTERNAL GENITALS.

Inflammation of the vulva is due to the same causes as inflammation elsewhere, namely, irritation and infection. The most frequent form of infection here is gonorrhoea, although other varieties of pus infection may be engrafted on wounds or abrasions.

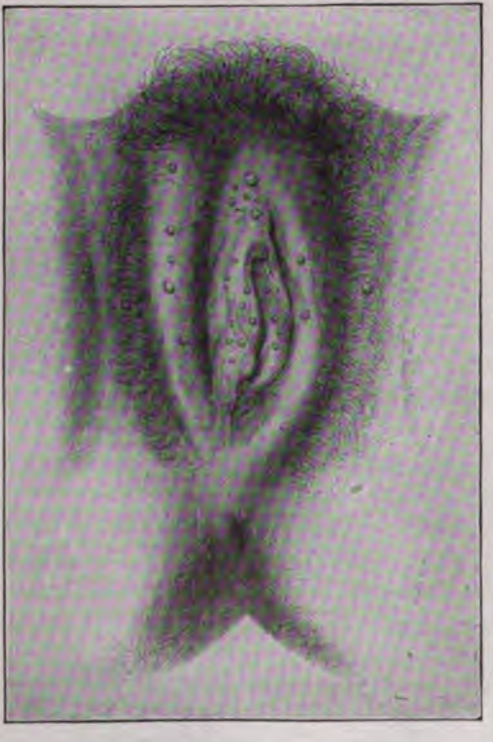


Fig. 216. Follicular Vulvitis. (A. Martin, after Huguier—*Atlas of Gynecology.*)

Gonorrhoeal Vulvitis. There is a free yellow discharge, with usually more or less involvment of the urethra and also of the ducts of the vulvo-vaginal glands (Fig. 50). There is no cause apparent for the persistence of a simple inflammation. Microscopic examination of the discharge shows gonococci.

Simple Vulvitis. Occurs most frequently in children and is due to uncleanliness of the parts or to an irritating vaginal discharge or to irritating urine or to scratching or other irritation. This is not usually as severe as gonorrhoeal inflammation and subsides when the parts are cleansed frequently and protected from irritation. A considerable proportion of the cases of chronic vulvitis in children are gonorrhoeal.

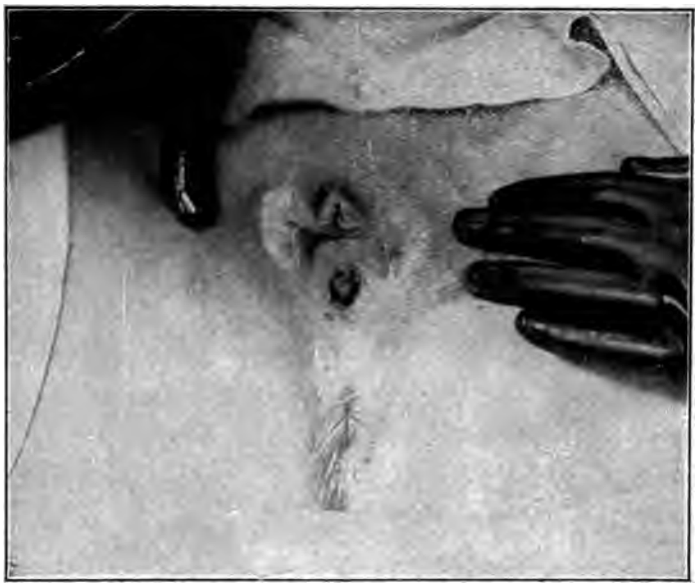


Fig 217. Kraurosis Vulvae. (Hirst – *Diseases of Women*.)

Consequently the discharge should be examined to determine that point.

Follicular Vulvitis is characterized by the inflammation being localized principally in the follicles here and there (Fig. 216).

Pruritis Vulvae. Itching of the genitals, from various causes, leads to scratching and consequent inflammation. Usually some cause can be found for the itching. If not, the affection is, for the time being, given the above name.

Kraurosis Vulvae (Fig. 217) is a peculiar neuro-atrophic condition of the external genitals, usually preceded by a long period of pruritis. The skin becomes atrophic and has a bleached and drawn and withered appearance. It is seen most frequently in elderly women, and is usually accompanied by intense pruritis, as attested by the history of the case and by the abrasions from scratching.

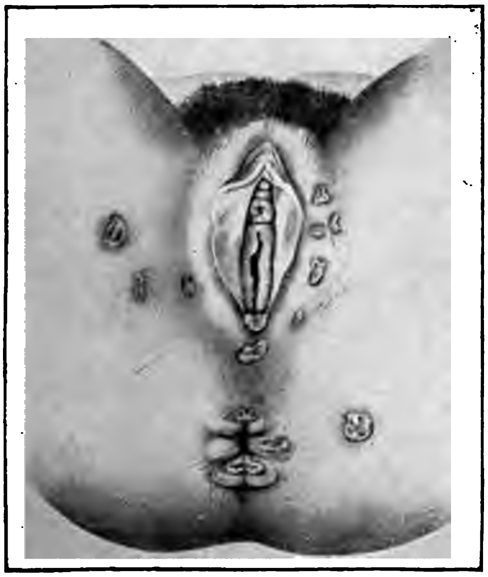


Fig. 218. Chancroidal Ulcers of the vulva. (Bovée—*Practice of Gynecology*.)

ULCER ON EXTERNAL GENITALS.

Simple Ulcer. It presents none of the characteristics of special ulcers. There is some source of irritation sufficient to account for the ulcer and it heals quickly under simple cleansing treatment.

Chancroidal Ulcer (soft chancre). This is an angry-looking sore with sharp-cut or undermined edges. It is painful. The margins are soft unless very old, and in any case do not present the extensive and firm induration found in the fully developed syphilitic chancre. Usually there are one or more small sores on the surfaces that come in contact with the secretion from the first sore (Fig. 218). There may be a history of suspicious coitus a few days previous to the development of the sore. The ulcer persists in spite of simple antiseptic remedies. After cauterization with carbolic acid, it presents healthy granulation and heals rapidly.

Syphilitic Ulcer. A syphilitic sore appearing about the external genitals may belong to the primary, secondary or tertiary stage of the disease.

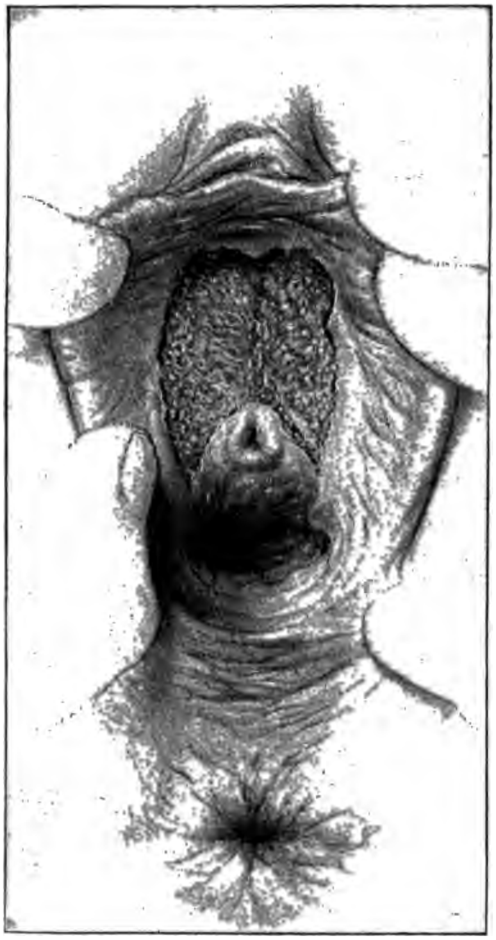


Fig. 219. A Tubercular Ulcer of the vulva. (Kelly—*Operative Gynecology.*)

(a) PRIMARY SYPHILITIC ULCER (HARD CHANCRE). This appears ten days or two weeks after intercourse, but may be preceded by a simple sore or chancroidal sore (mixed infection). It is not painful unless irritated or inflamed. It gradually enlarges and develops a distinct induration. It is, a little later, accompanied by enlargement of the inguinal glands. The enlarged glands are painless, discrete and non-suppurating. There is only one such sore. It is followed in one or two months by the secondary manifestations.

(b) SECONDARY SYPHILITIC ULCER. These are usually multiple and very superficial, amounting to little more than abrasions. They show a moist, raw-looking surface, or are slightly raised whitish areas ("mucous patches"). They are accompanied by one or more of the various other secondary manifestations of syphilis, the most common of which are persistent sore throat, mucous patches in the mouth, enlargement of post-cervical and epitrochlear glands, roseola on chest and abdomen and loosening of the hair.

(c) TERTIARY SYPHILITIC ULCER. This usually has deep undermined edges. It is destructive and not especially painful, and is accompanied by other evidences of syphilis, such as ulcer of rectum, gummata along tibia, night pains, etc. It yields to anti-syphilitic treatment, provided the general health is no too much depressed.

Tubercular Ulcer (Fig. 219). This is a chronic ulcer with indurated margins and presenting small yellow granules in the base. It is not particularly painful, but is persistent in spite of cleansing treatment. Microscopic examination of an excised piece, shows tuberculosis.

Malignant Ulcer (Figs. 220, 221, 222). This is a chronic ulcer with a considerable area of induration around it. It bleeds easily, and the bleeding is no checked by the application of 10 per cent. copper sulphate solution. The ulcer persists in spite of treatment. Microscopic examination of an excised piece shows carcinoma or sarcoma.

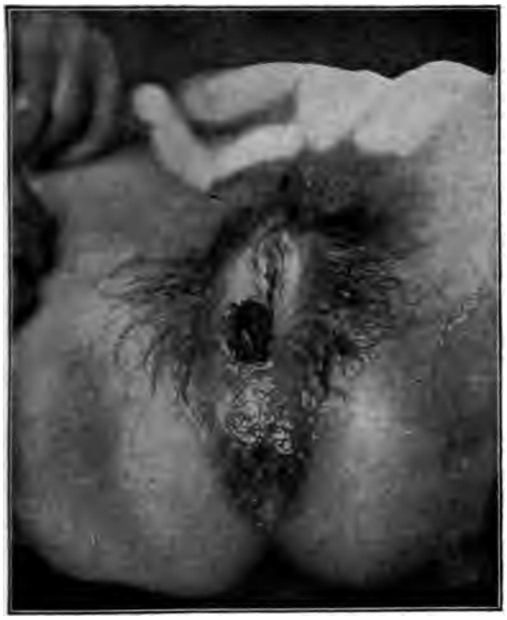
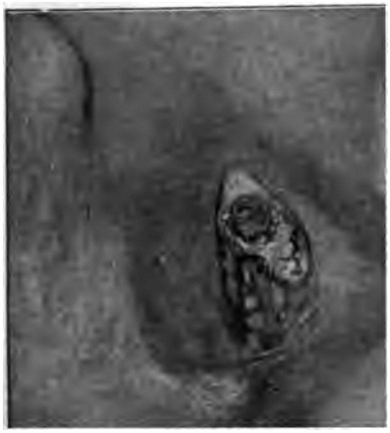


Fig. 220. An Epithelioma of the right labium. (Hirst—*Diseases of Women.*)



Epithelioma of the clitoris. (Hirst—
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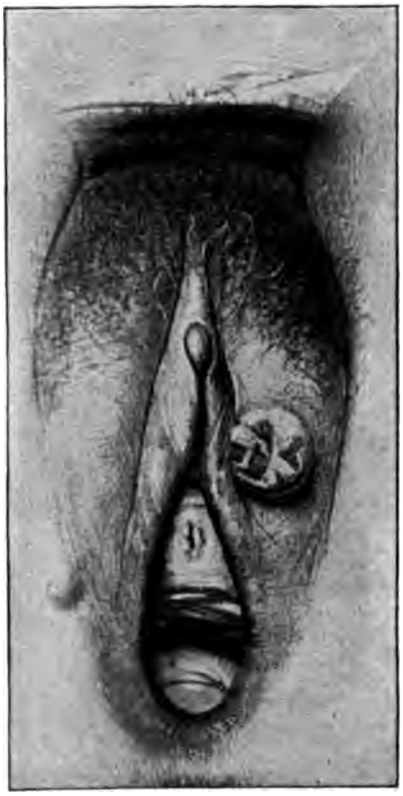


Fig. 221. A beginning Epithelioma of the left labium majus. (Kelly—*Operative Gynecology.*)

Ulcus Rodens Vulvae. This is chronic and is irregular in shape, extending in various directions and healing in others, and resists treatment. It presents none of the pathognomonic signs of chancroidal, syphilitic, tubercular or malignant ulcer. The essential feature of ulcus rodens vulvae is a chronic destructive ulcer of the vulva that can not properly be assigned to any of the other classes.

MALFORMATIONS OF EXTERNAL GENITALS.

The more common deviations from the normal, found in uninjured genitalia, are as follows: (See page 185)

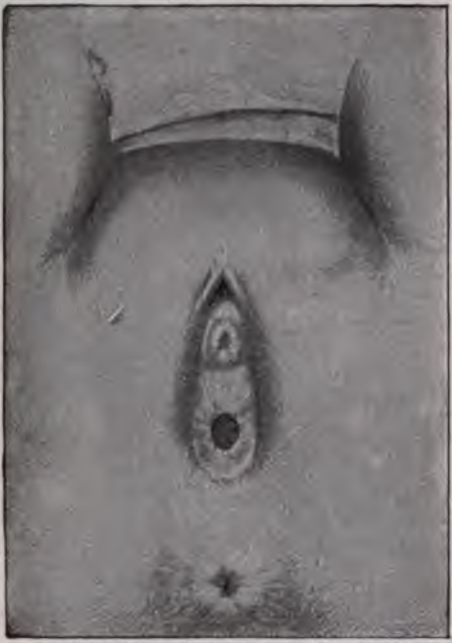


Fig. 223. A case of Adherent Prepuce, the clitoris being entirely hidden. (Kelly—*Operative Gynecology.*)

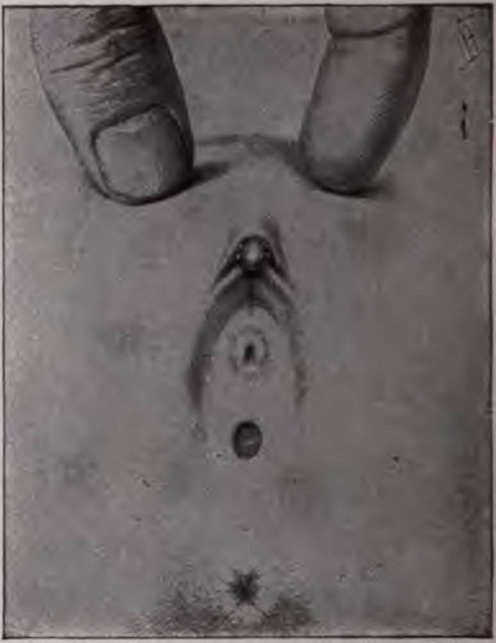


Fig. 224. The same case, with the Adhesions Separated and the prepuce pushed back and the clitoris exposed. Notice the smegma concretions which had formed under the adherent prepuce. (Kelly—*Operative Gynecology.*)

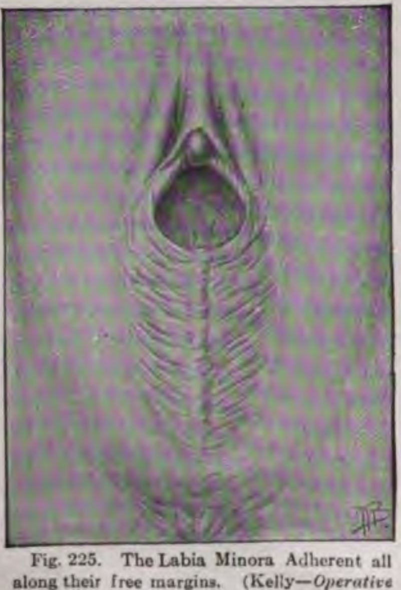


Fig. 225. The Labia Minora Adherent all along their free margins. (Kelly—*Operative Gynecology.*)

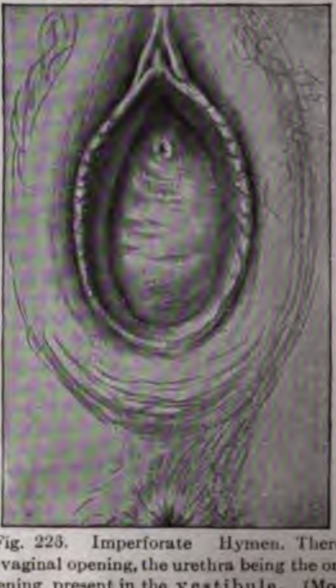


Fig. 226. Imperforate Hymen. There is no vaginal opening, the urethra being the only opening present in the vestibule. (Montgomery—*Practical Gynecology.*)

Preputial Adhesions (Figs. 223 and 224). The prominent end of the clitoris seems to be absent. Investigating further, to see just what is the trouble, it is found that the folds of the labia minora, which encircle the clitoris, are agglutinated so that the glans clitoridis is partially or entirely hidden.

Labial Adhesions. The labia minora may be adherent partially or completely, as shown in Fig. 225.

Imperforate Hymen. There is no opening into the vagina and there has been no menstrual flow. There may or may not be some bulging of the imperforate hymen. If there is much blood collected back of the obstruction, fluctuation may be obtained. Fig. 226 shows the appearance of the vestibule in such a case. Figs. 227 and 228 give a diagramatic representation of the conditions internally in different cases.

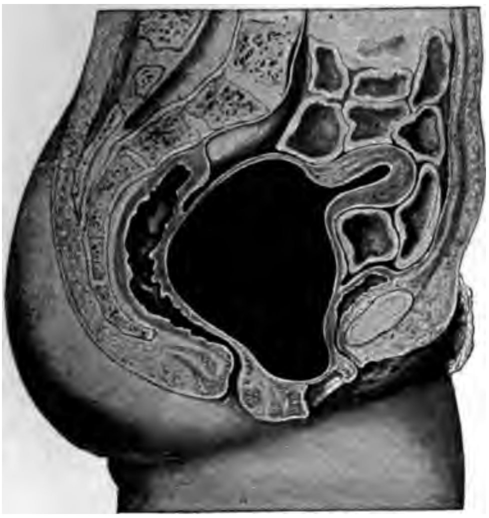


Fig. 227. Hematocolpos, which may result from imperforate hymen or from atresia at the lower portion of the vagina. The menstrual blood has not yet distended the uterus. (Montgomery—*Practical Gynecology*.)

Absence of Vagina. Fig. 229 shows the condition of the external genitals in a patient with no vagina.

Double Vagina (Figs. 230, 231). The opening of the second vaginal canal may be very apparent or it may be hardly noticeable on cursory inspection. In one of my cases there was simply an unevenness, that attracted my attention almost by accident. Investigating the slight irregularity at the side of the vaginal

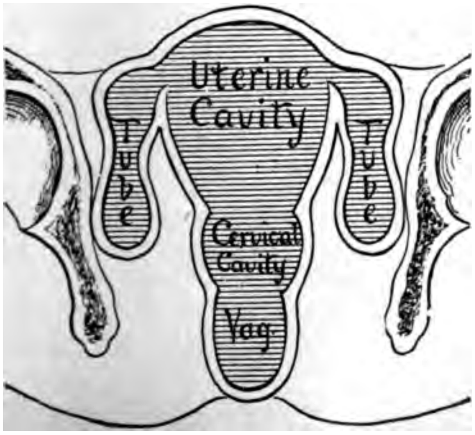


Fig. 228. Imperforate Hymen, with Uterus and Tubes distended with menstrual blood. (Ashton—*Practice of Gynecology*.)

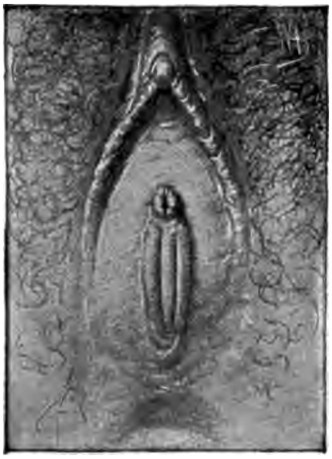


Fig. 229. The appearance of the external genitals in a case of Absence of the Vagina. (Kelly—*Operative Gynecology*.)

entrance, I found a slit-like opening leading into a second vaginal canal which was collapsed.

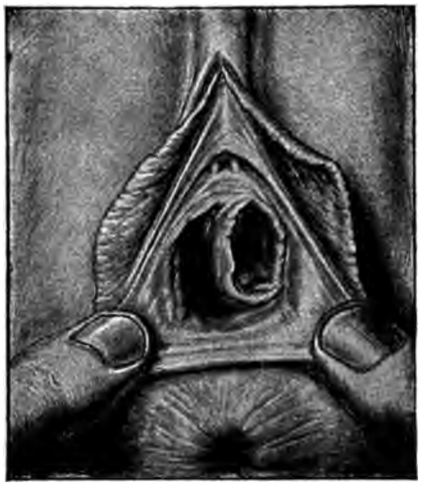


Fig. 230. The appearance of the external genitals in a case of Double Vagina. (Kelly—*Operative Gynecology*.)

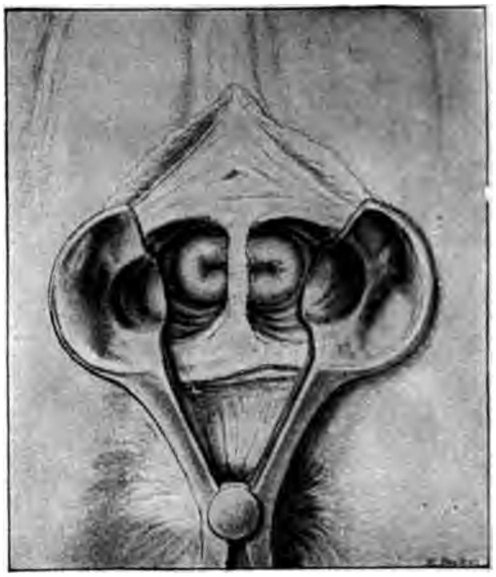


Fig. 231. Same case as Fig. 230, with Speculum Introduced, exposing the two vaginal canals and the half cervix at the top of each. (Kelly—*Operative Gynecology*.)

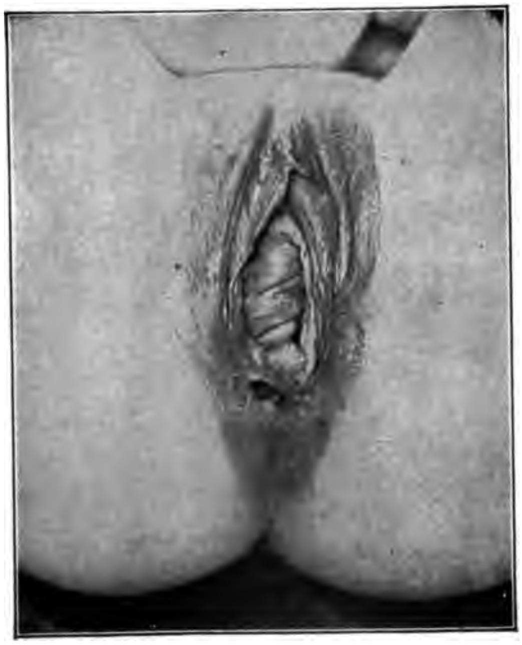


Fig. 232. Complete Laceration of the Perineum. The sphincter ani muscle has been torn and the ends are separated. The small dark area is an exposed portion of the red mucosa of the rectum. (Hirst—*Diseases of Women*.)

LACERATIONS ABOUT VULVA AND PERINEUM.

There are of course slight lacerations of the hymen in normal coitus, but the resulting condition belongs under the normal appearances of the genitalia (Fig. 210). The same may be said of the usual widening and relaxation of the vaginal opening resulting from labor (Fig. 213).

Laceration from Labor. Laceration of the perineum and vagina in labor produces changes varying all the way from a moderate enlargement of the vaginal orifice to complete destruction of the perineum, with exposure of the rectal mucosa and incontinuence of feces.

Fig. 215 sh[illegible] [illegible]eni[illegible]g of the vaginal [illegible] [illegible]ate second [illegible] The [illegible]

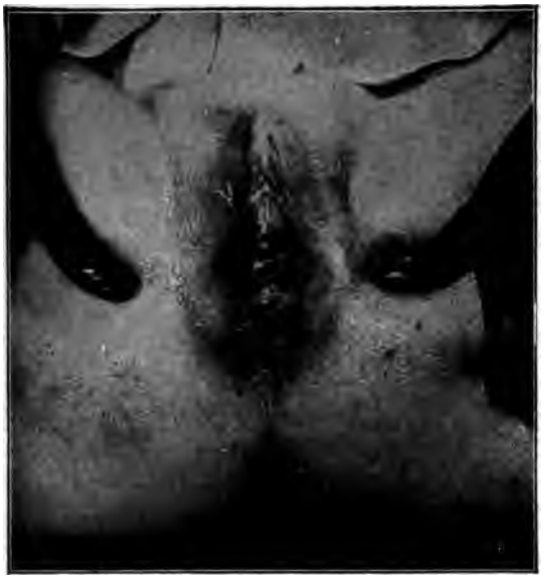


Fig. 233. Another case of Laceration through the Perineum into the Rectum. Notice the separation of the sphincter ends and also the patch of rectal mucosa. (Hirst—*Diseases of Women.*)

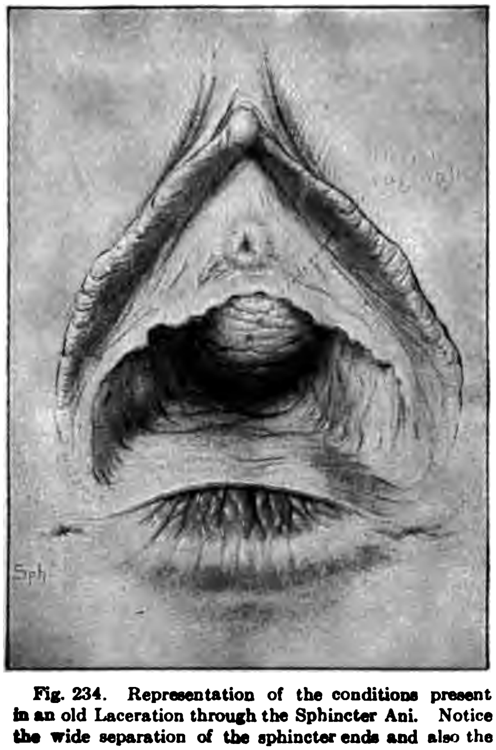


Fig. 234. Representation of the conditions present in an old Laceration through the Sphincter Ani. Notice the wide separation of the sphincter ends and also the exposed rectal mucosa. Each end of the torn sphincter muscle, is indicated by a slight dimple in the skin. —*Operative Gynecology.*)

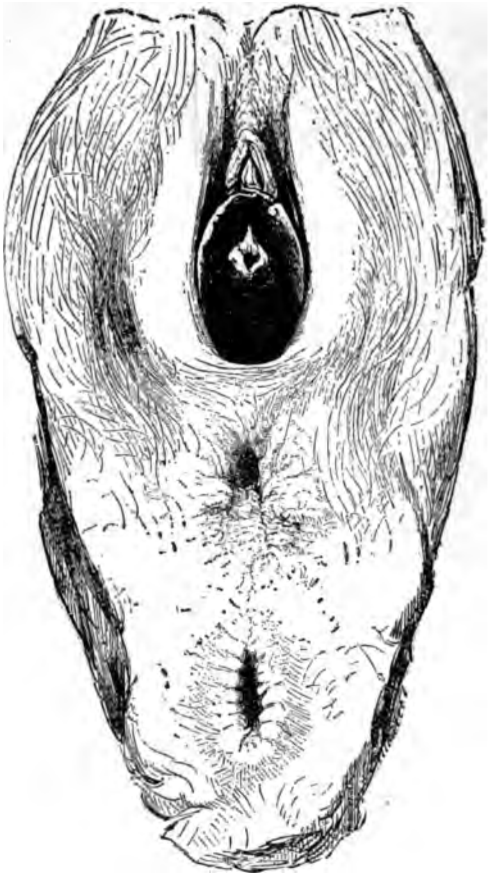


Fig. 235. The scar and opening resulting from a "Central Tear" of the perineum. This is a very rare condition. The child passed out through the laceration-opening, situated between the posterior commissure and the rectum, instead of through the vaginal opening proper. (Hart and Barbour—*Manual of Gynecology.*)

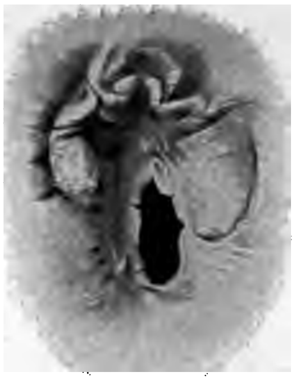


Fig. 236. Laceration of the Hymen from Rape, in a girl aged twelve. The child died in ten days of peritonitis. (Edgar—*Practice of Obstetrics.*)

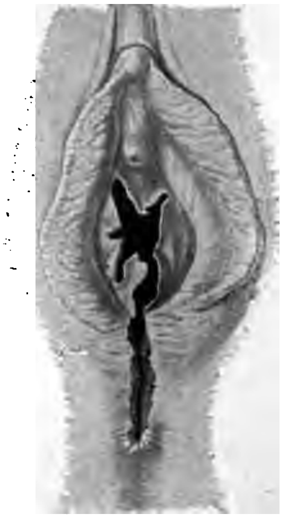


Fig. 237. Complete Laceration of the Pelvic Floor in an infant of eight months, from Rape. (Edgar—*Practice of Obstetrics.*)

integrity of the pelvic floor are shown in chapter I. Fig. 239 shows a severe tear of the pelvic floor, with resulting relaxation and loss of support.

Figs. 232 and 233 show complete tears of the perineum, into the rectum. The red mucosa from within the rectum shows at the site of the rectal tear. The torn ends of the sphincter ani produce a slight dimple in the surface covering them (Fig. 234).

Fig. 235 shows a central tear of the perineum, a very unusual form to result from child-birth.

Lacerations from Other Causes. Fig. 236 shows a laceration of the hymen forcible coitus (rape) in a girl aged twelve. There were also deeper inju ing peritonitis, from which she died in ten days. Fig. 237 shows a te same cause involving the perineum in an infant. Fig. 238 shows a deep tear of the perineum, causing a recto-perineal fistula, from violent coitus.

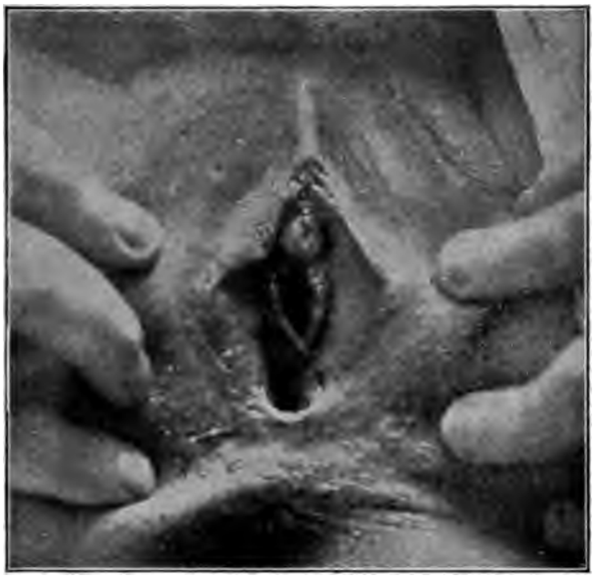


Fig. 238. Laceration of Perineum with resulting Fistula, from Violent Coitus. (Hirst—*Diseases of Women.*)

SWELLING ABOUT EXTERNAL GENITALS.

Colpocele, Cystocele, Rectocele. These swellings appear as the result of lacerations. Fig. 239 shows a severe second degree tear, involving practically all the

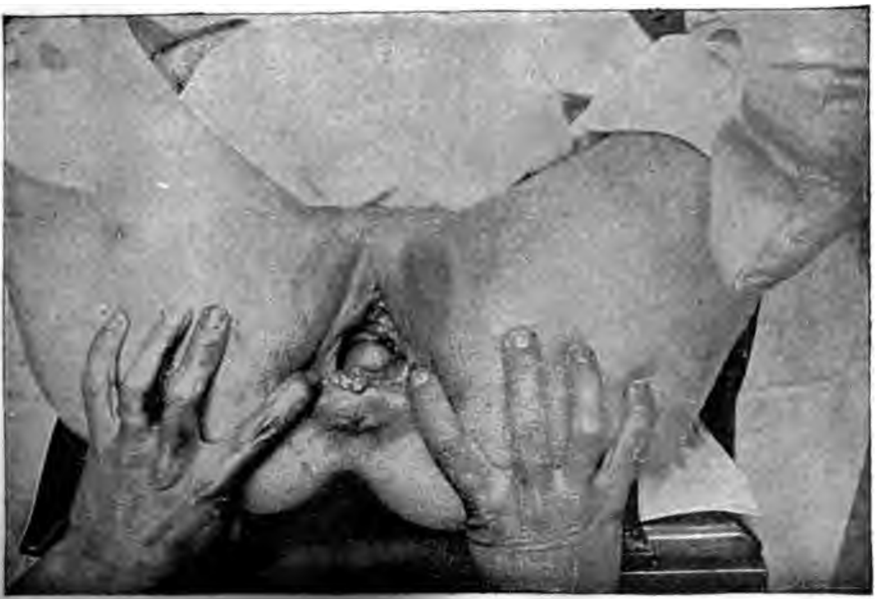


Fig. 239. An old Laceration fr [illegible] Most of the perineum has been torn and there is protrusion of the posterior vaginal [illegible] or colpocele). (Baldy—*Am. Text-book of Gynecology.*)

perineum down to the sphincter ani muscle, and also a posterior colpocele. Figs. 240 and 241 show such a laceration with the anterior and posterior vaginal walls beginnings to protrude, and there is also protrusion of the bladder and rectum (cystocele and rectocele). In such a condition, if the patient be directed to bear down, the protrusion will become still more marked. Fig. 242 shows marked protrusion of the anterior vaginal wall accompanied by the base of the bladder (cystocele).

The fact that the bladder wall is prolapsed along with the vaginal wall, is indicated by the fact that the patient has more or less difficulty in urinating, and in some cases she must push back the mass before she can urinate satisfactorily. When there is doubt as to whether the bladder wall comes down, the lowest part of the bladder cavity may be located with a steel bougie (Fig. 243).

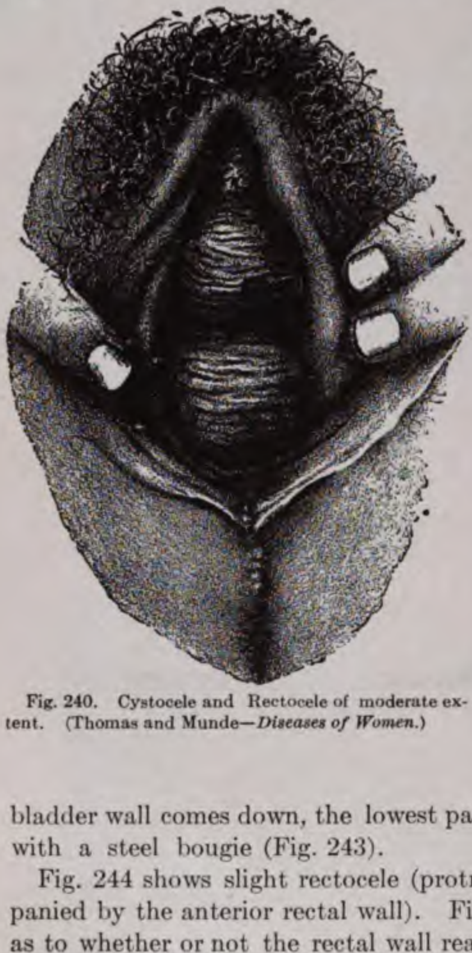


Fig. 240. Cystocele and Rectocele of moderate extent. (Thomas and Munde—*Diseases of Women.*)

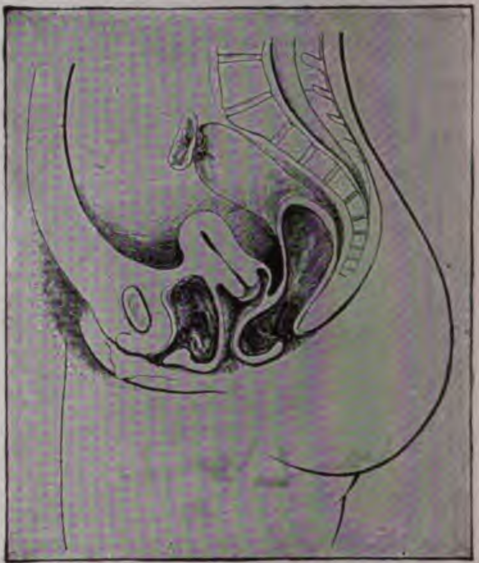


Fig. 241. Cystocele and Rectocele of moderate extent. Sectional view. (Thomas and Munde—*Diseases of Women.*)

Fig. 244 shows slight rectocele (protrusion of the posterior vaginal wall accompanied by the anterior rectal wall). Fig. 245 shows a large rectocele. The point as to whether or not the rectal wall really follows the prolapsed vaginal wall, may be settled in such a case by rectal examination (Figs. 246, 247).

Inflammation of Vulva (erysipelas, cellulitis). There are the usual signs and symptoms of acute inflammation. Owing to the large amount of loose cellular tissue, the inflammatory infiltration may cause very marked swelling.

Hematoma of Vulva. There is rapid swelling following a puncture with a hypodermic needle or a fall or other injury. There is marked enlargement, painful on pressure and presenting in a short time discoloration from blood pigment. Th is no fever nor erysipelatous redness nor other evidence of acute inflammation. Fig. 248 shows a hematoma of the vulva.

Edema of Vulva (from heart or liver disease or from pressure by a pelvic tumor). This produces a boggy, painless swelling which pits on pressure. There is no evidence of acute inflammation or of hematoma. There may be accompanying

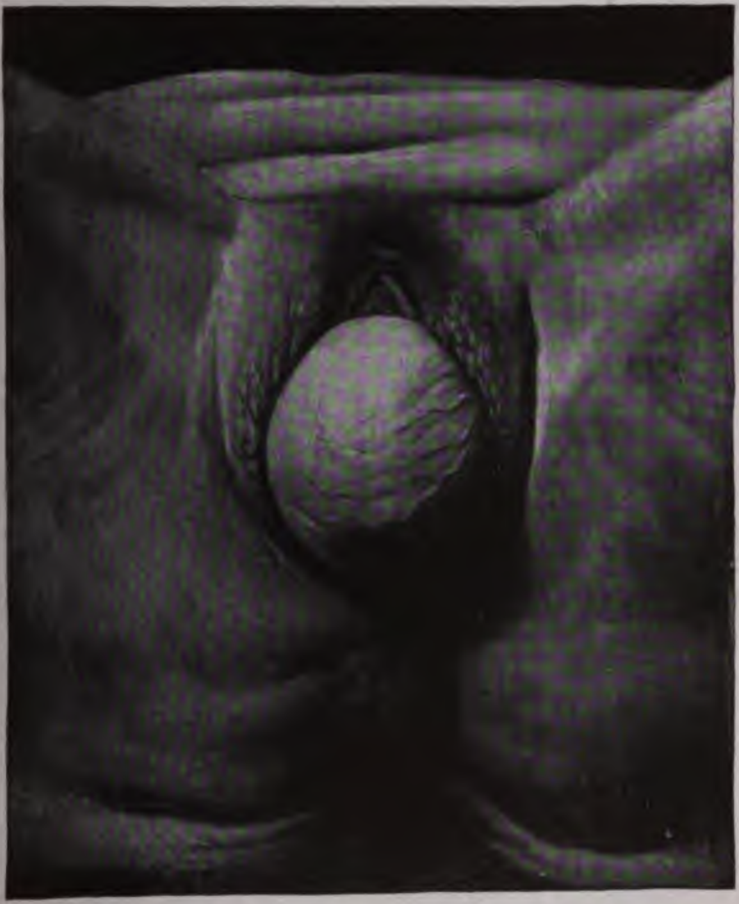


Fig. 242. Large Cystocele. (Montgomery—*Practical Gynecology*.)

edema of the abdominal wall and lower extremities. There is found some internal t for the edema (heart disease with failing circulation, tumor or tructing the pelvic circulation).

va. There is a gradual development of tissue hyper- ory infiltration. The swelling is not partic- itting on pressure. It is accompanied by

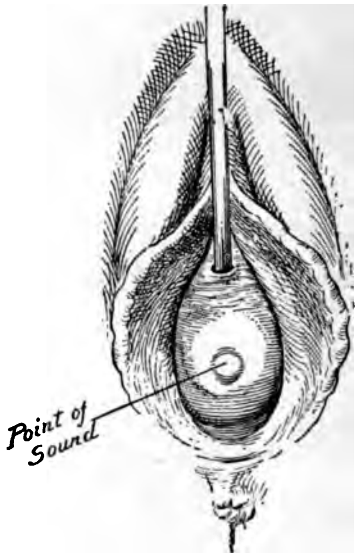


Fig. 243. Testing for Cystocele with Sound introduced into bladder. (Ashton—*Practice of Gynecology.*)

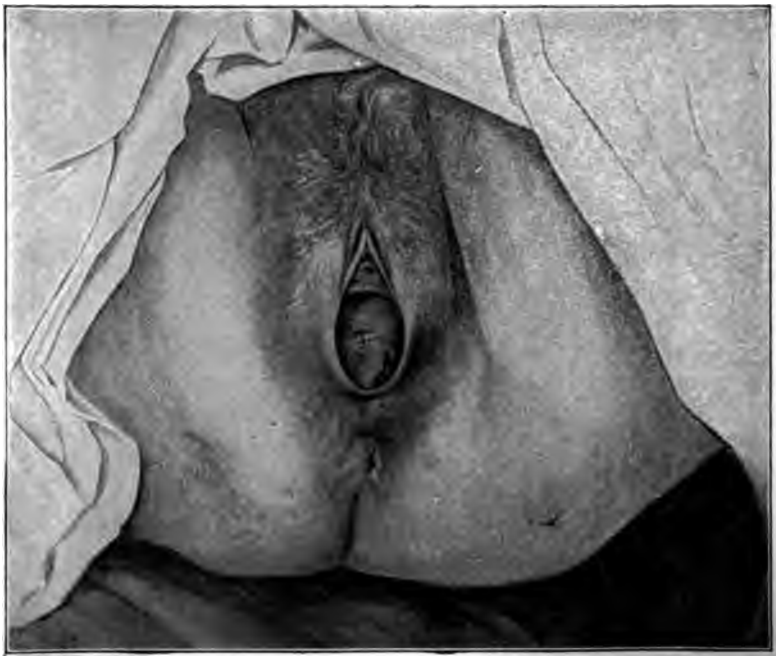


Fig. 244. Small Rectocele. (Hirst—*Diseases of Women.*)

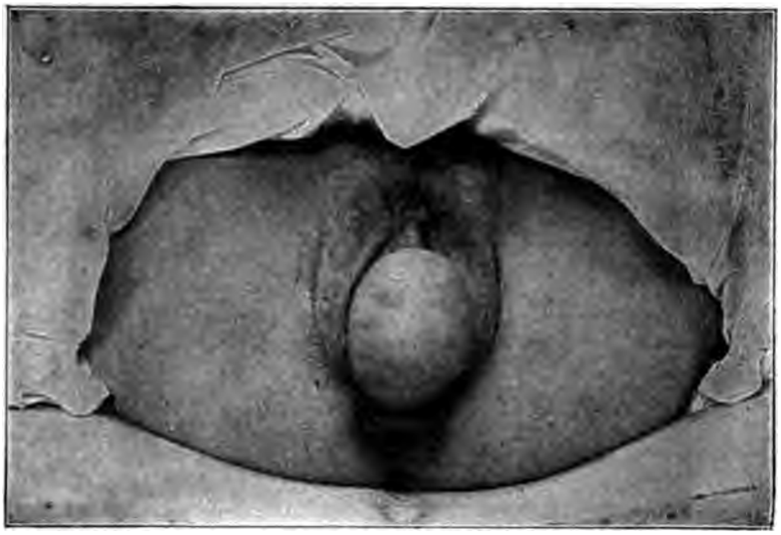
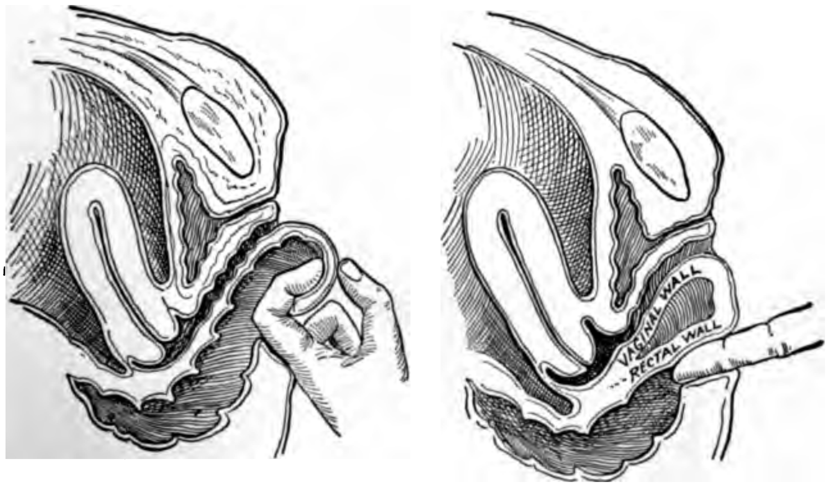


Fig. 245. Large Rectocele. (Hirst—*Diseases of Women.*)



Figs. 246 and 247. Method of Differentiating between Rectocele and Posterior Colpocele. **The index finger in the** rectum determines whether or not the rectal wall follows the prolapsing **vaginal wall. The hand** should be gloved. Fig. 246, Rectocele. Fig. 247, No Rectocele. **(A [illegible] of Gynecology.)**

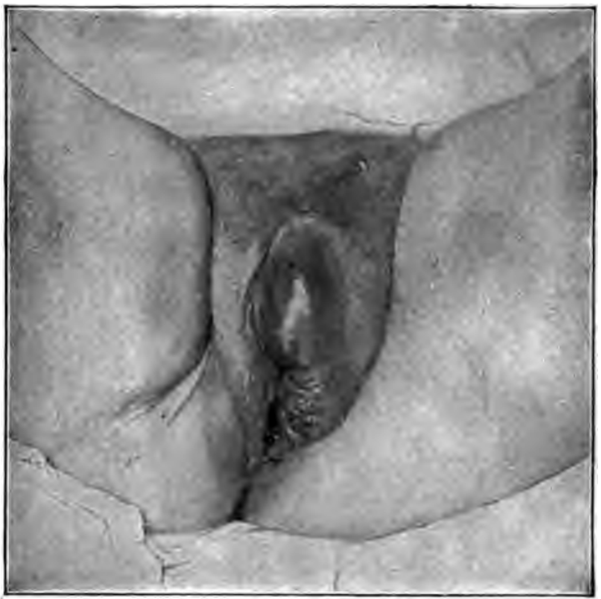


Fig. 248. Hematoma of the Vulva. (Hirst—*Diseases of Women.*)

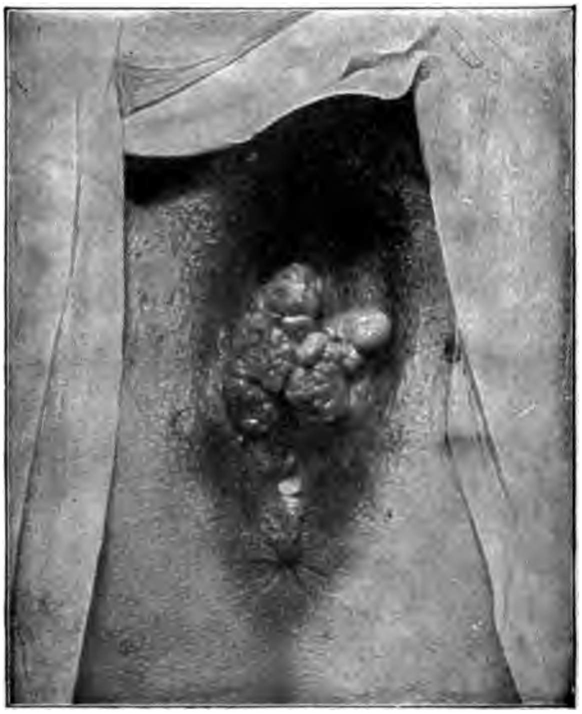


Fig. 249. Stasis Hypertrophy of the Labia Minora. (Hirst—*Diseases of Women.*)

scar-tissue, resulting from chronic ulceration, of such extent and so situated at the vaginal entrance as to obstruct the lymph and blood circulation (Figs. 249, 250, 251, 252, 253).

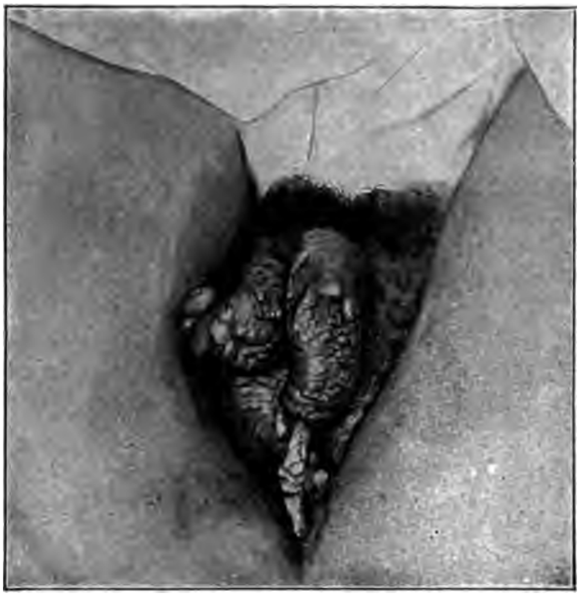


Fig. 250. Stasis Hypertrophy of the Vulva. (Hirst—*Diseases of Women.*)

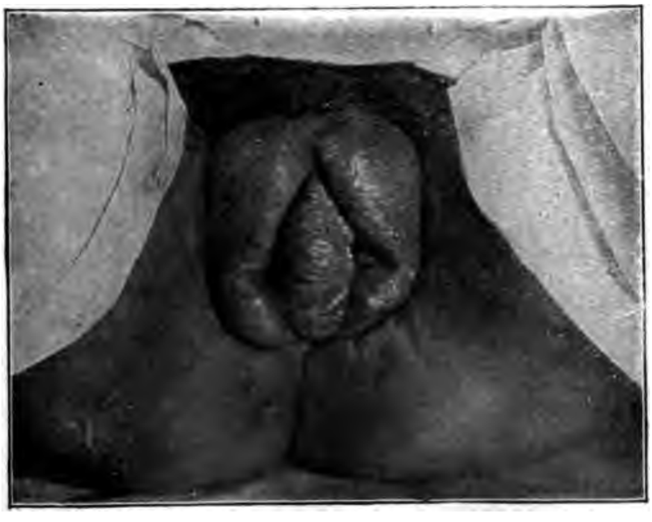


Fig. 251. Stasis Hypertrophy of the Vulva. (Hirst—*Diseases of Women.*)

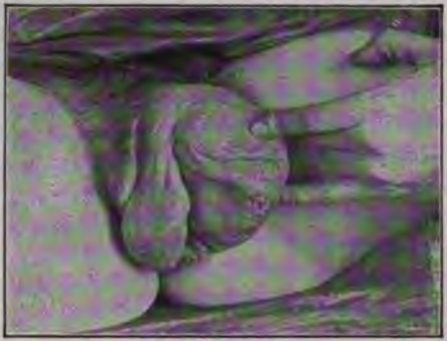


Fig. 252. Stasis Hypertrophy about external genitals and edema from pregnancy. (Dickinson—*American Text-book Obstetrics.*)

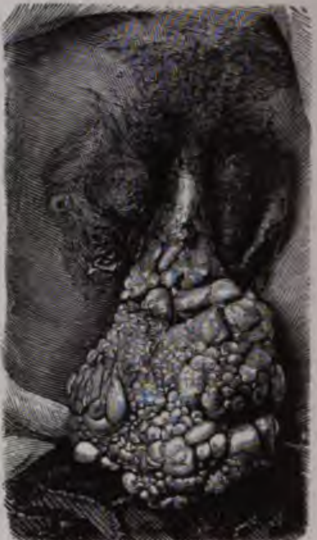


Fig. 253. So-called Elephantiasis—probably stasis hypertrophy. (Byford, after Winkel—*Manual of Gynecology.*)

Fig. 254 shows the scar tissue about the bony arch, distorting the tissues and interfering with the return flow of blood and lymph.

Another cause of stasis hypertrophy, is the infiltration and hypertrophy due to the lymph vessels being choked with a parasite, the filaria sanguinis hominis. This is seen almost exclusively in tropical countries.

Elephantiasis of Vulva. The term "ele-

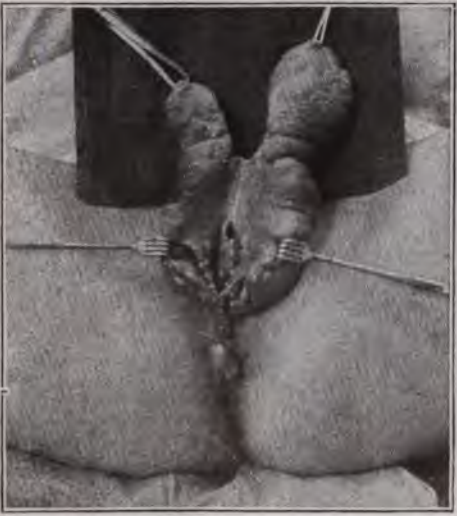


Fig. 254. Stasis Hypertrophy of Vulva, with enlarged parts raised so as to show the ulceration and scar tissue about the pubic arch. (Kiliani—*Surgical Diagnosis.*)

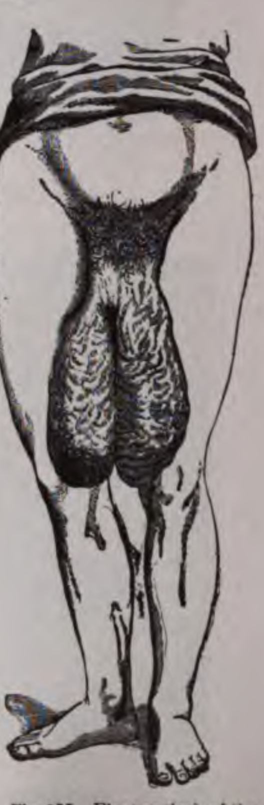


Fig. 255. Elephantiasis of the Labia. (Baldy—*American Text-book of Gynecology.*)

phantiasis" is very appropriately applied to the cases of enormous labial hypertrophy, such as shown in Fig. 255. The stasis hypertrophy previously described. is often spoken of as "elephantiasis," but I think it not advisable to use the term so loosely (see chapter IV).

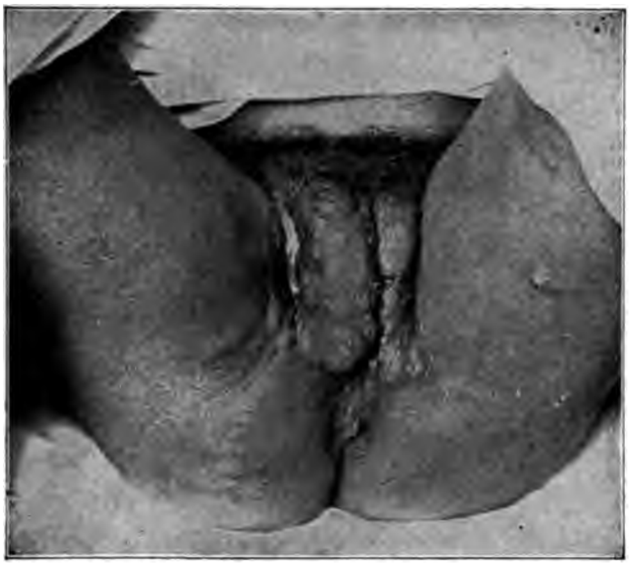


Fig 256. Varicose Veins of the Vulva. (Hirst—*Diseases of Women.*)

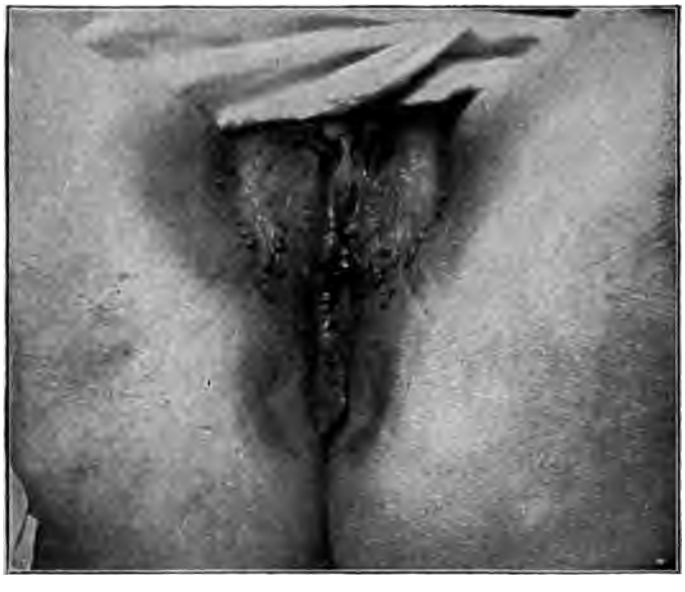


Fig. 257 Scattered Condylomata of the Vulva. (Hirst—*Diseases of Women.*)

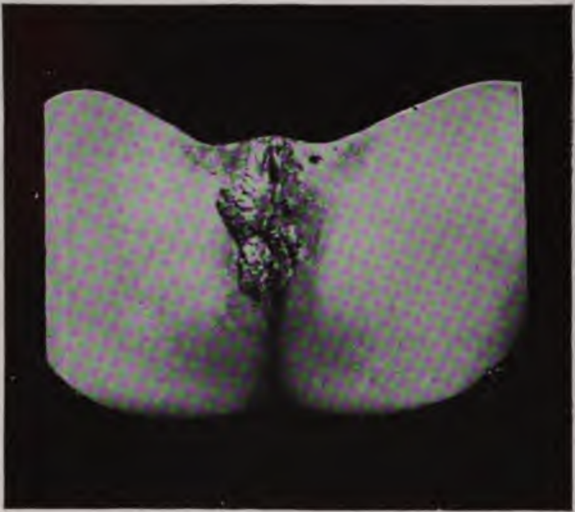


Fig. 258. Small Masses of Condylomata. (Gilliam—*Practical Gynecology*.)

Varicose Veins of Vulva. These not infrequently cause marked swelling, as shown in Fig. 256. Serious enlargement of the veins is found most frequently in pregnancy or in the case of some pelvic tumor or inflammatory mass obstructing the pelvic circulation. Alarming hemorrhage has followed the rupture of an enlarged vein in such cases.

Condylomata of Vulva. FROM CHRONIC IRRITATION. As a result of persistent irritation and discharge about the vulva, small papillary masses grow from the skin at various points (Fig. 257). They may come from any persistent irritation, though chronic gonorrhoea is the most frequent cause. Sometimes they appear in great profusion (Fig. 258) and occasionally they coalesce and form large papillary masses (Figs. 259, 260). These papillary growths are called pointed condylomata, in contradistinction to the flat condylomata which are usually due to syphilis.

FROM SYPHILIS In secondary syphilis, white areas with infiltration sufficient,

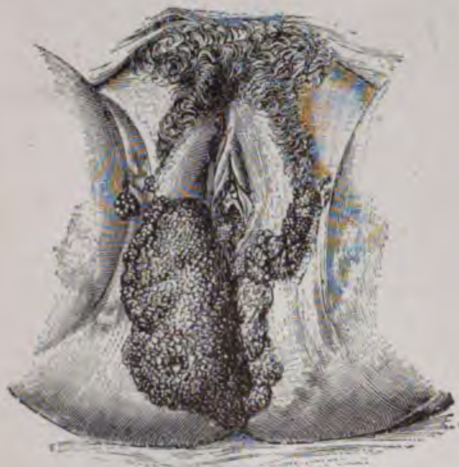


Fig. 259. Condylomata forming large Masses. (Pozzi—*Treatise on Gynecology*.)

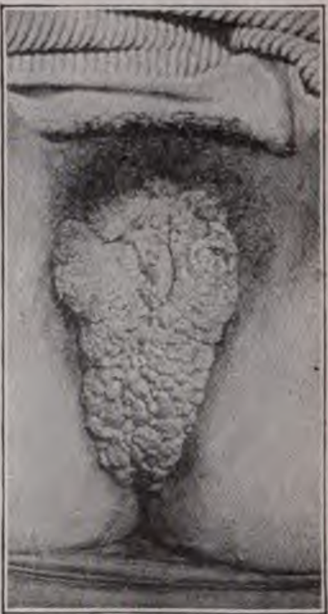


Fig. 260. The whole vulgar region occupied by Massed Condylomata. (Kustner—*Kurzes Lehrbuch der Gynakologie*.)

to raise them above the surface, often appear about the external genitals. They may be few or many (Figs. 261, 262), and they may be raised much or little.

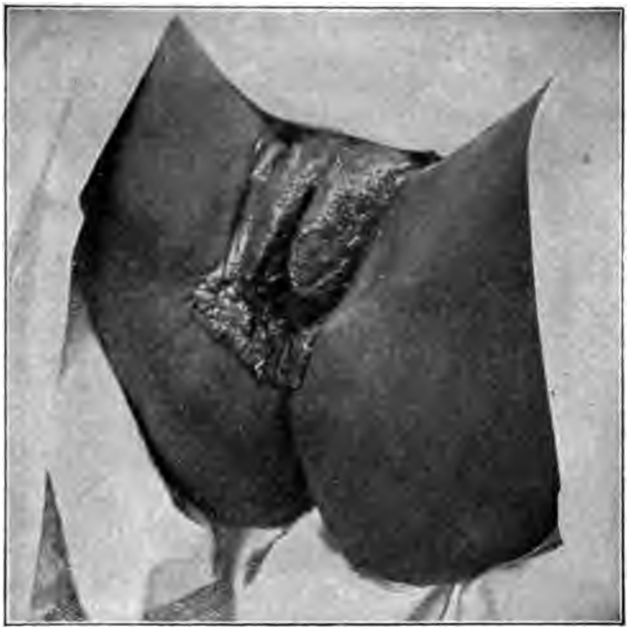


Fig. 261. Syphilitic Infiltration and Condylomata about the vulva. (Hirst—*Diseases of Women.*)

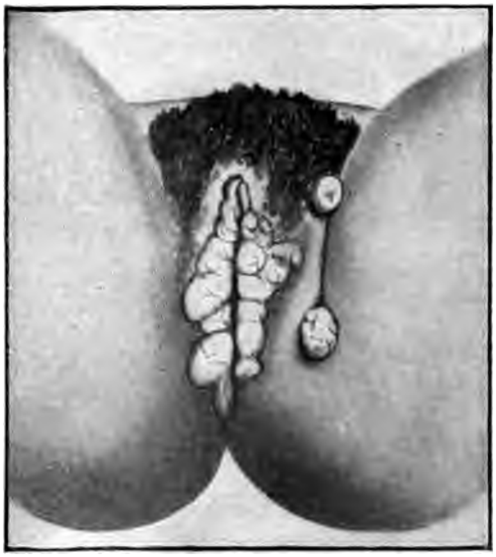


Fig. 262. Syphilitic Condylomata. Flat variety. (Bovée—*Practice of Gynecology.*)

They are usually flat condylomata, only rarely being pointed or papillary (Fig. 263).

Vulvo-vaginal Gland Cyst or Abscess. The swelling has much the same appearance whether it be a cyst or an abscess. Figs. 264 and 265 show abscesses of the gland. Fig. 266 shows a cyst of the gland.

Hypertrophy of Labia. The hypertrophies affect principally the labia minora, either the free portion on one or both sides (Fig. 267) or that portion extending up over the clitoris as the prepuce. The hypertrophied portions contain much redundant tissue and are corrugated and usually somewhat pigmented. In some cases the hypertrophy becomes very marked, as in the Hottentot apron, shown in Fig. 268.

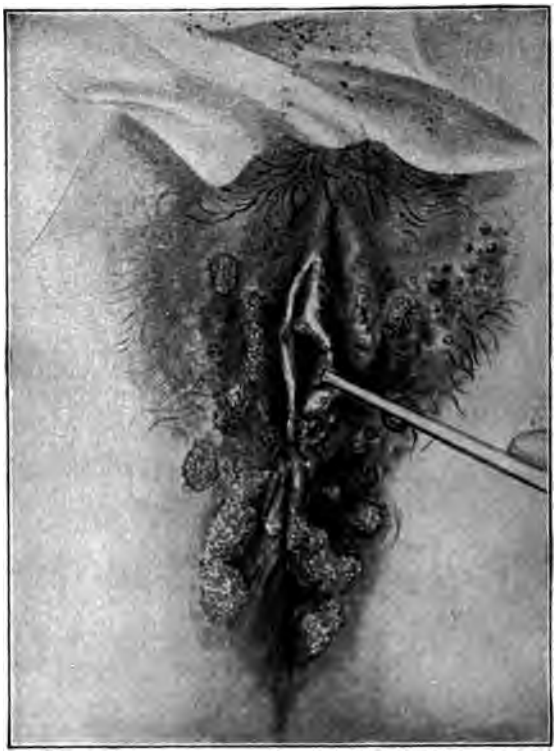


Fig. 263. Syphilitic Condylomata. Pointed variety. (Hirst—*Diseases of Women*).

Hypertrophy of Clitoris. This is much rarer than hypertrophy of labia. Occasionally the clitoris is considerably enlarged. Fig. 269 shows such case.

Malignant Disease of Labia or Clitoris. Malignant disease (carcinoma or sarcoma) appears upon the labia as a small reddened nodule, which later ulcerates.

Fig. 221 shows a beginning carcinoma of left labium majus. Fig. 270 shows a small carcinoma of labium minus. Figs. 271 and 272 show carcinoma of the labium at a later stage. Fig. 273 shows an advanced carcinoma of the vulvo-vaginal gland. Fig. 274 shows a sarcoma of the labium. Fig. 222 shows a carcinoma of clitoris.

Non-malignant Tumor of Labia or Clitoris. Fibromata and lipomata and cysts occur here, though not very frequently. Fig. 275 shows a small fibroma of the left labium majus. Fig. 276 shows a larger solid tumor of the labium. Fig. 277 shows a number of small cysts on the labium. Figs. 278 and 279 show large labial cysts. Fig. 280 shows a cyst of the clitoris.

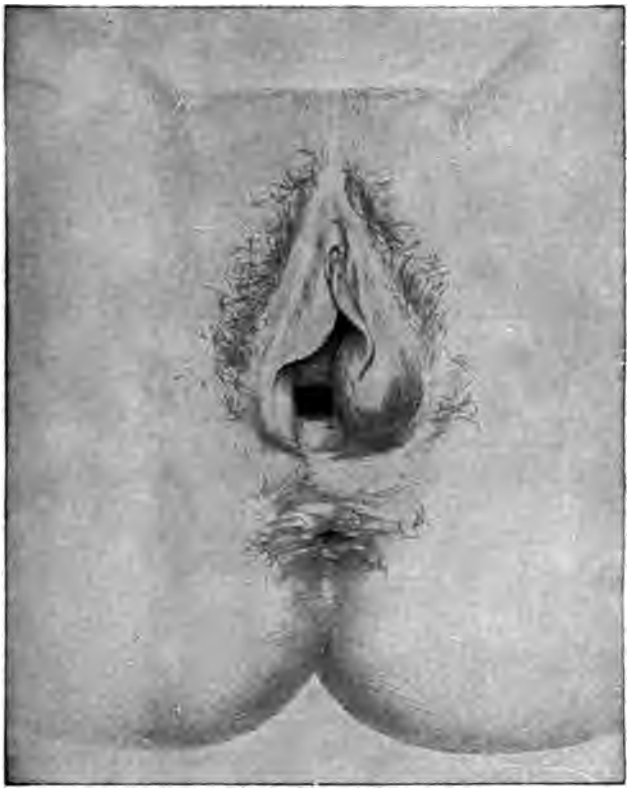


Fig. 264. Abscess of Vulvo-vaginal Gland, left side. (Kelly—*Operative Gynecology.*)

Pudendal Hernia. A hernia of intestine or omentum or other intraperitoneal structure, may take place through the inguinal canal and appear in the labium majus of that side (Fig. 281).

n of pudendal hernia is that which comes by way of the vagina (Fig.

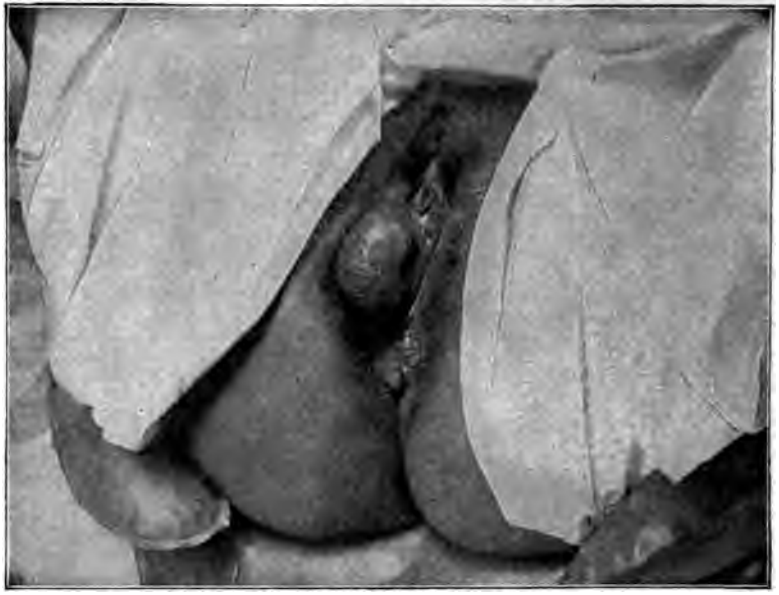


Fig. 265. Another case of Abscess of Vulvo-vaginal Gland, right side. (Hirst—*Diseases of Women.*)

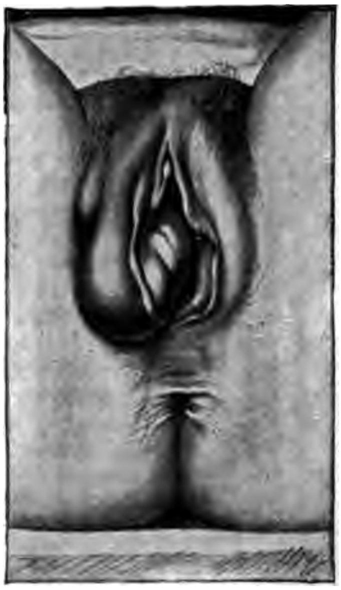


Fig. 266. Cyst of the Vulvo-vaginal Gland. (Montgomery—*Practical Gynecology.*)

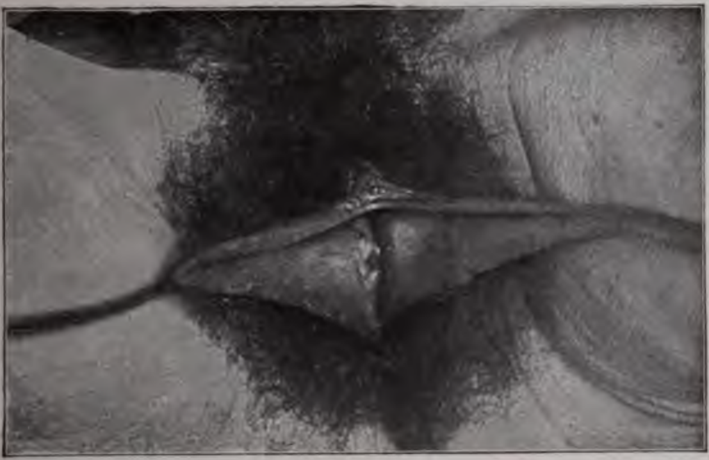


Fig. 267. Hypertrophy of the Labia Minora. (Hirst—*Diseases of Women.*)

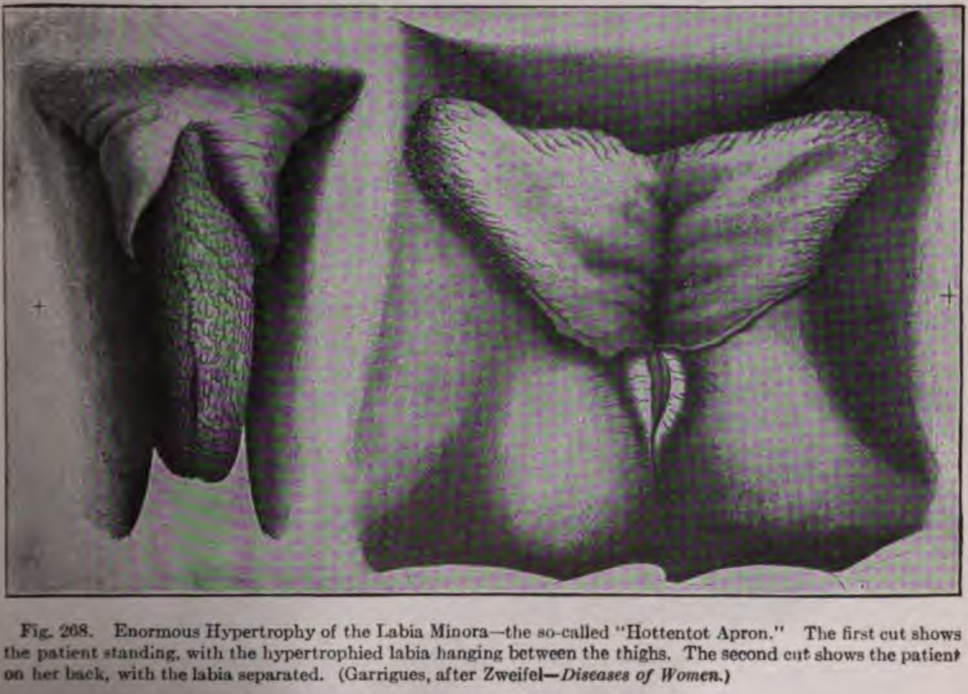


Fig. 268. Enormous Hypertrophy of the Labia Minora—the so-called "Hottentot Apron." The first cut shows the patient standing, with the hypertrophied labia hanging between the thighs. The second cut shows the patient on her back, with the labia separated. (Garrigues, after Zweifel—*Diseases of Women.*)

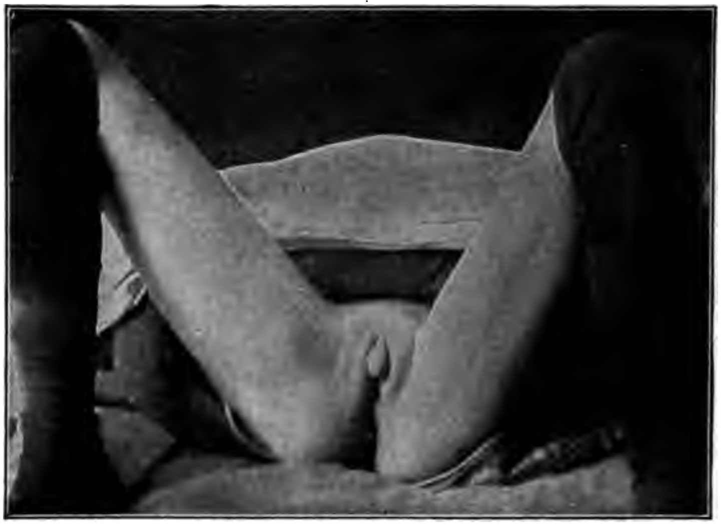


Fig. 269. Hypertrophy of the Clitoris. (Hirst—*Diseases of Women.*)

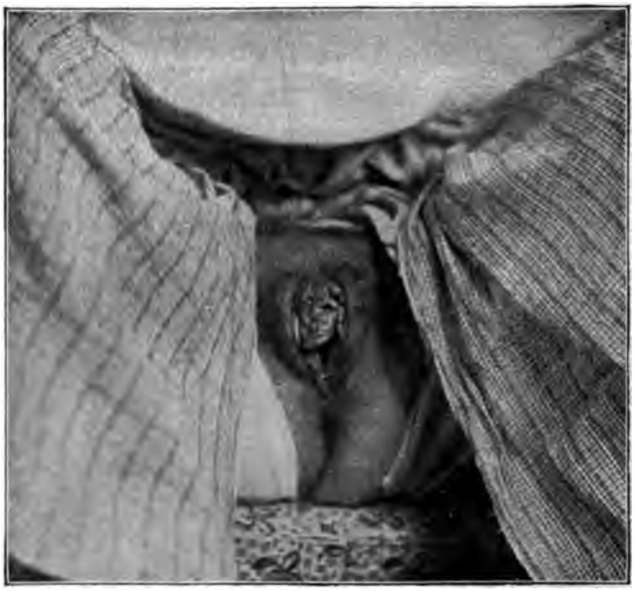


Fig. 270. Carcinoma of Labium Minus, beginning. (Hirst—*Diseases of Women.*)

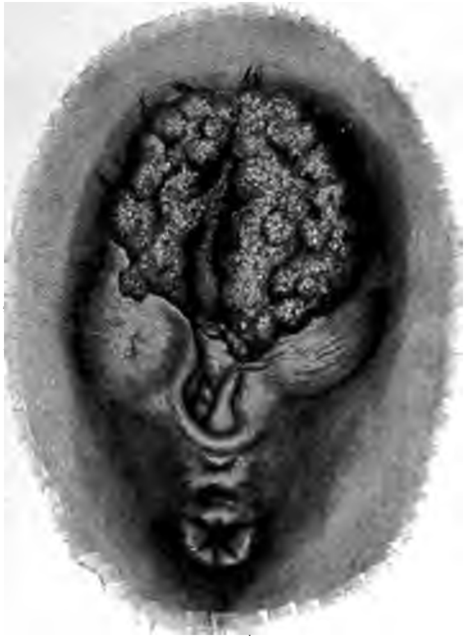


Fig. 271. Carcinoma of Labium at a larger stage. (Hirst—*Diseases of Women.*)

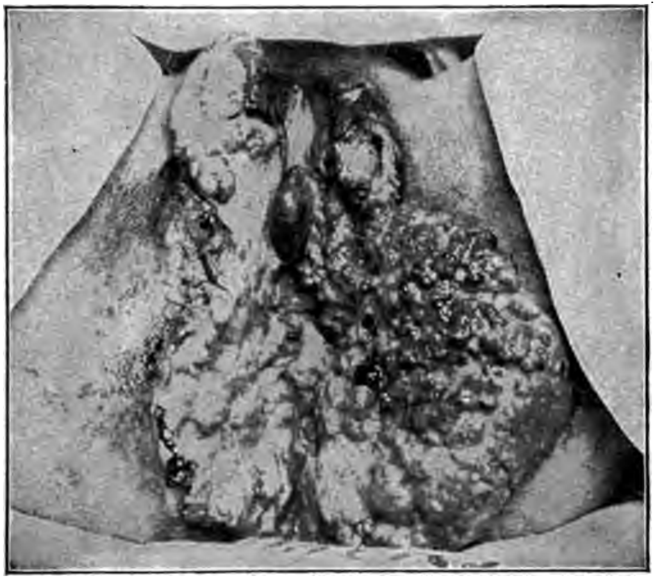


Fig. 272. Carcinoma of Labium in a still later stage. (Hirst—*Diseases of Women.*)

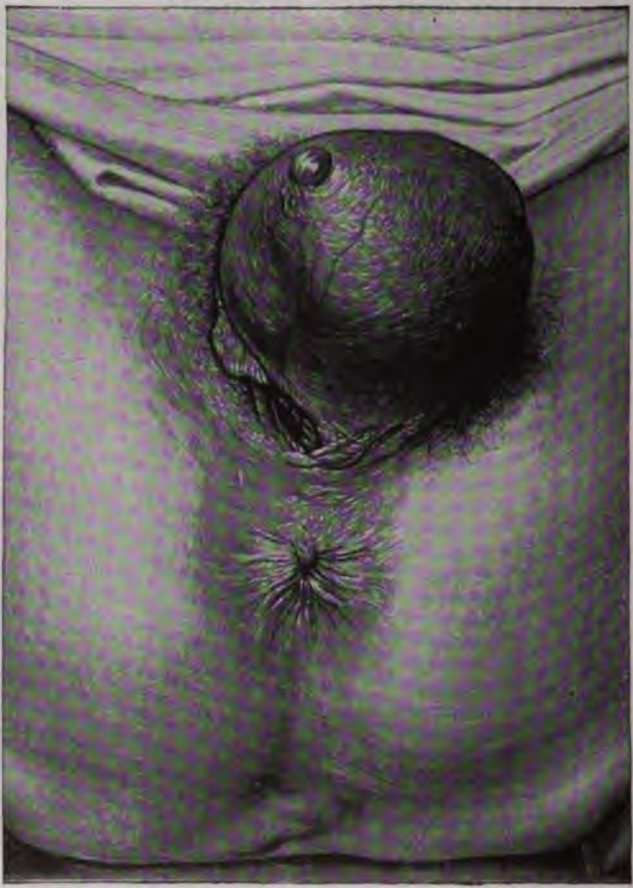


Fig. 273. A large Carcinoma of the left Vulvo-vaginal Gland. (Kelly—*Operative Gynecology.*)

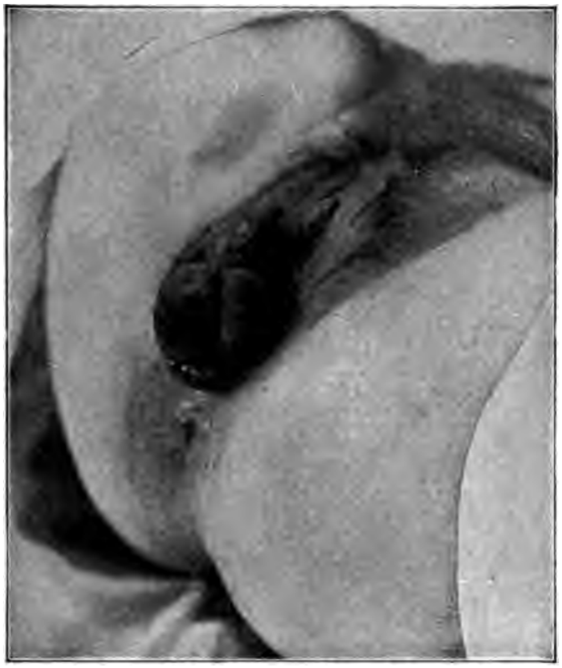


Fig. 274. Sarcoma of Labium. (Hirst—*Diseases of Women.*)

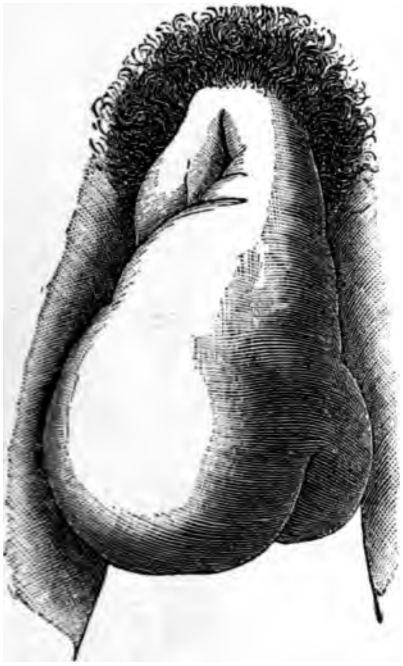


Fig. 275. A small Fibroma of left Labium Majus. (Baldy—*American Text-book of Gynecology.*)

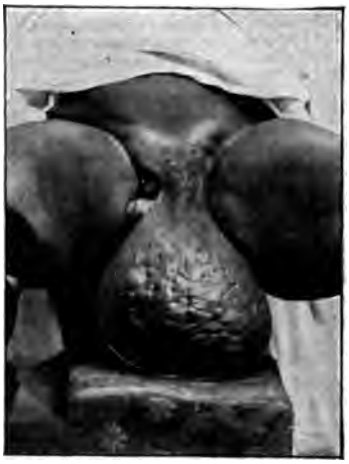


Fig. 276. A large Fibroma of the Labium. (Montgomery—*Practical Gynecology.*)

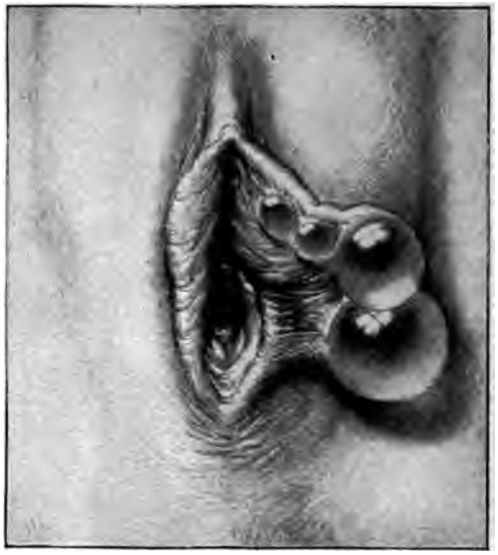


Fig. 277. Small Cysts of the Left Labium Minus. (Kelly—*Operative Gynecology.*)

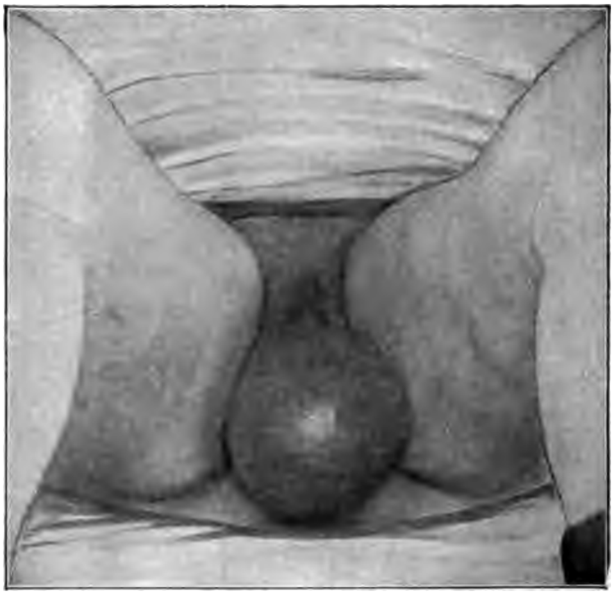


Fig. 278. A large Labial Cyst. (Hirst—*Diseases of Women.*)

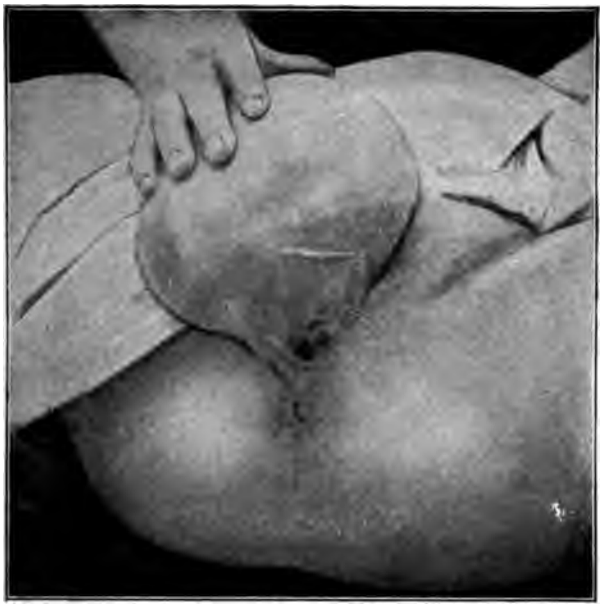


Fig. 279. Another large Labial Cyst. (Hirst—*Diseases of Women.*)

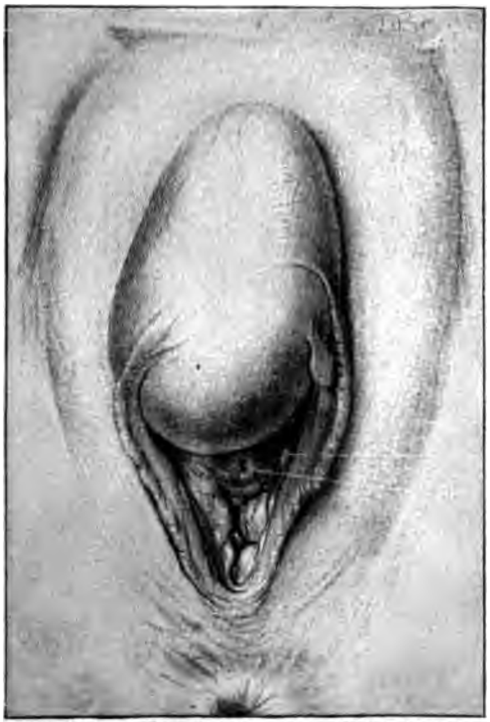


Fig. 280. A Cyst of the Clitoris. (Kelly—*Operative Gynecology.*)

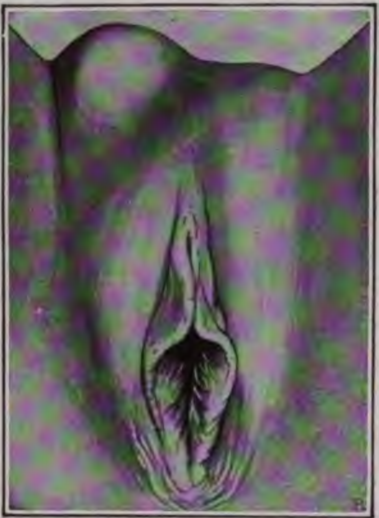


Fig. 281. An Inguinal Hernia becoming Pudendal. (Dudley—*Practice of Gynecology.*)

282), the protrusion taking place in front of the uterus in some cases (Fig. 327) and behind the uterus in others.

Pudendal Hydrocele. A collection of fluid occasionally occurs in the canal of Nuck, forming a hydrocele, which corresponds to hydrocele of the cord in the male.

Tumor of Round Ligament. Fibromyoma of the round ligament is a rare condition and one that causes much distortion of the structures about the inguinal canal, consequently it is likely to lead to an erroneous diagnosis. It should be considered whenever there is a peculiar swelling in the neighborhood of the inguinal canal.

Prolapse of the Urethral Mucosa (Fig. 283). This occurs to a slight extent in many women who have borne children or have had inflammation of the urethra. Not infrequently the protrustion is marked and no doubt leads in many cases to an erroneous diagnosis of caruncle. The prolapsed mucosa encircles a considerable part of the circumference of the meatus, and a close inspection will show that the small mass presents the smooth, though irregular, surface of hypertrophied mucosa, instead of the papillary projections usually present in urethral caruncle. Again, the meatus is much widened from the previous injury or inflammation, and the prolapsing of the mucosa may bring into view the orifice of the duct, or Skene's gland, on one or both sides (Fig. 48).

Urethral Caruncle (Fig. 284). This is a distinct new growth, usually papillary in form, springing from the region of the meatus. It may have a narrow pedicle or a broad attachment, but does not tend to encircle the meatus as does prolapsed mucosa.

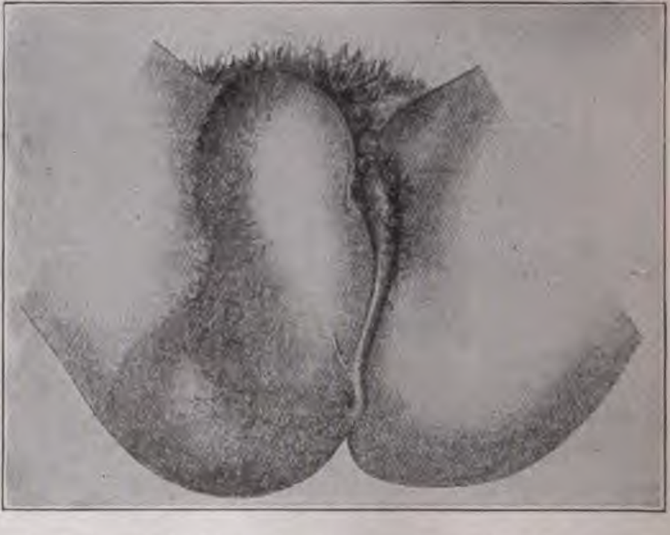
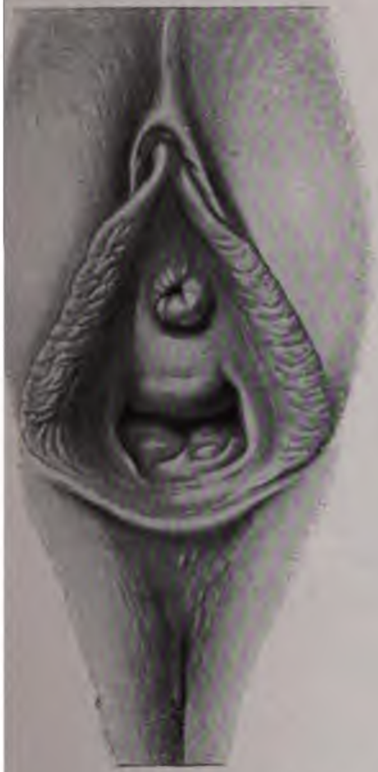


Fig. 282. A Pudendal Hernia which came by way of the Vagina. (H. Macnaughton-Jones, after Winckel—*Diseases of Women.*)

lalignant Disease of Urethra. This starts usually in some small spot of irrita- about the meatus, and in the early stage presents a small ulcer or induration. er the infiltration involves the vestibule, urethra and adjacent tissues.

uburethral Abscess. This consists of a pouch formed by a diverticulum from urethra, usually from the inferior wall. Inflammation and suppuration take e in this pouch, which may or may not drain irregularly into the urethra. n distended, it may project at the vaginal orifice (Fig. 285) like a small cyst of nterior vaginal wall. Fig. 286 gives a clear idea of the condition.



g. 283. Prolapse of the Urethral Mucosa. ntgomery—*Practical Gynecology.*)

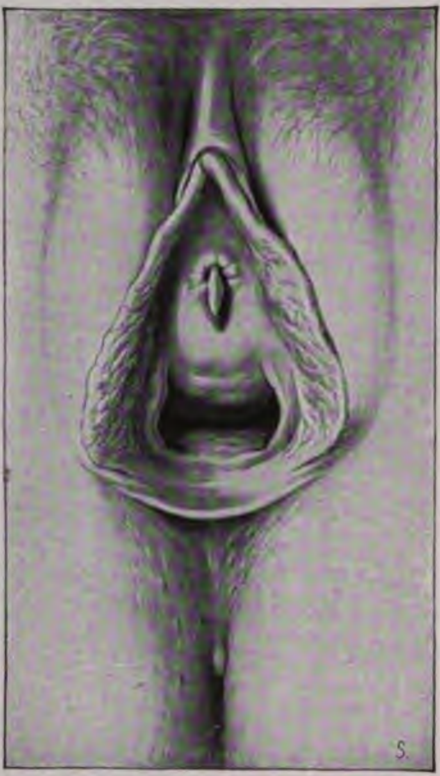


Fig. 284. Urethral Caruncle. (Montgomery—*Practical Gynecology.*)

olapse of Uterus (Fig. 287). When the uterus prolapses sufficiently, the firm x, with the external os near the center, appears at the vestibule (Fig. 288), or it come farther out as shown in Fig. 289, or it may come still farther, so that ntire uterus is outside the body (Fig. 290).

e bladder may or may not prolapse along with the uterus. Fig. 291 represents e in which the bladder does not prolapse. Fig. 292 represents a case in which ladder does come down with the displaced uterus. The method of locating ladder by the introduction of a sound, is shown in Fig. 293. Ulcers of various

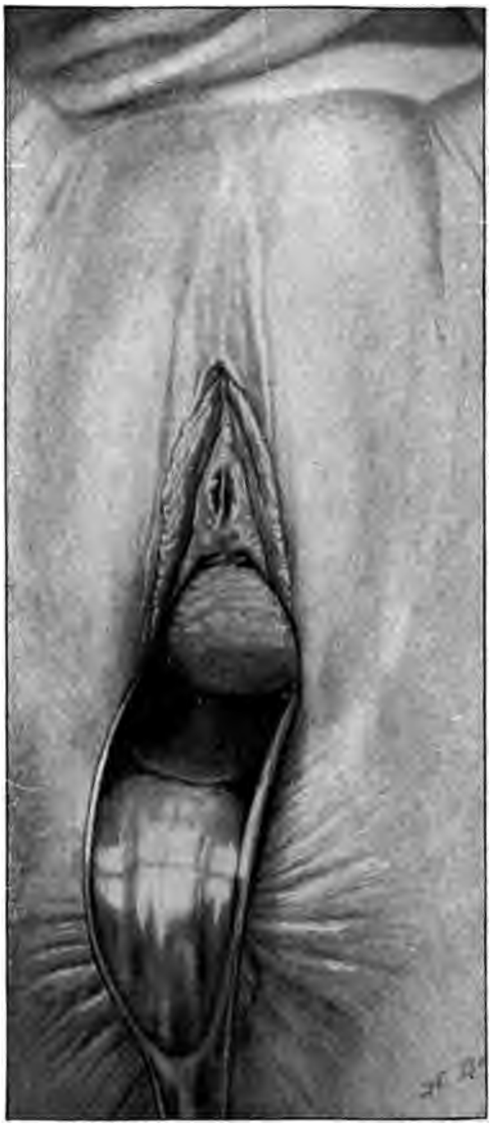


Fig. 285. Suburethral Abscess. View from in front. (Kelly—*Operative Gynecology.*)

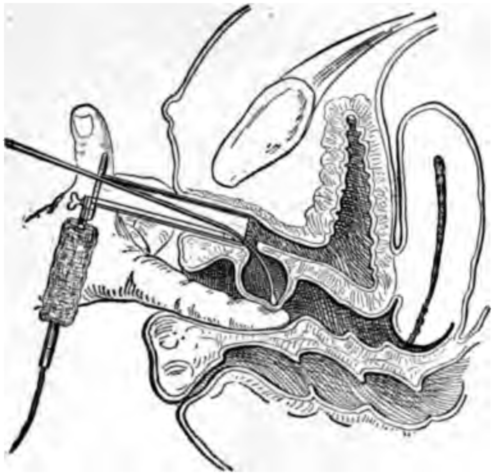


Fig. 286. Testing for Suburethral Abscess. (Ashton—*Practice of Gynecology.*)

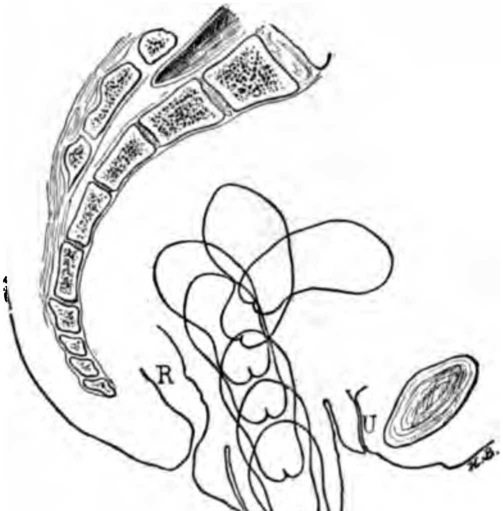


Fig. 287. Prolapse of the Uterus, showing the various steps in the process. (Kelly—*Operative Gynecology.*)

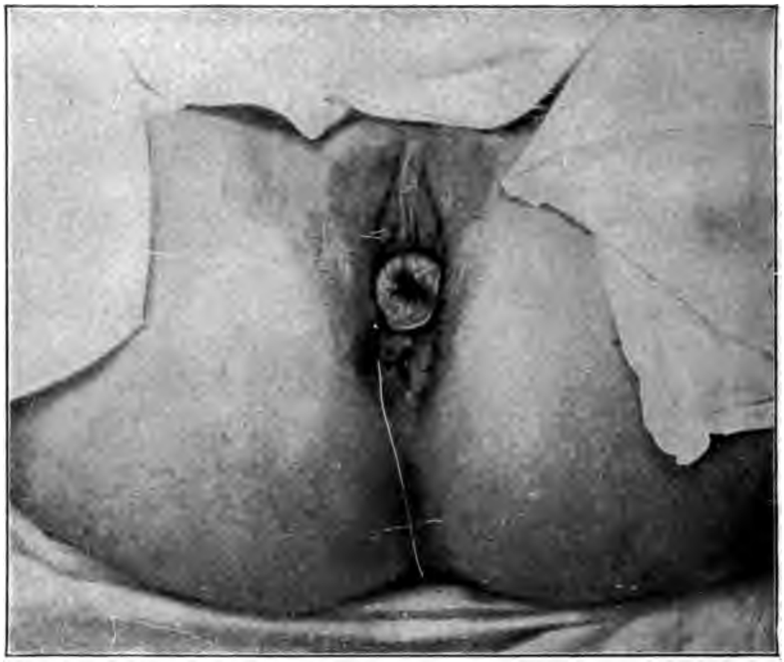


Fig. 288. A case of Prolapse of the Uterus. The cervix is at the vestibule. (Hirst—*Diseases of Women.*)

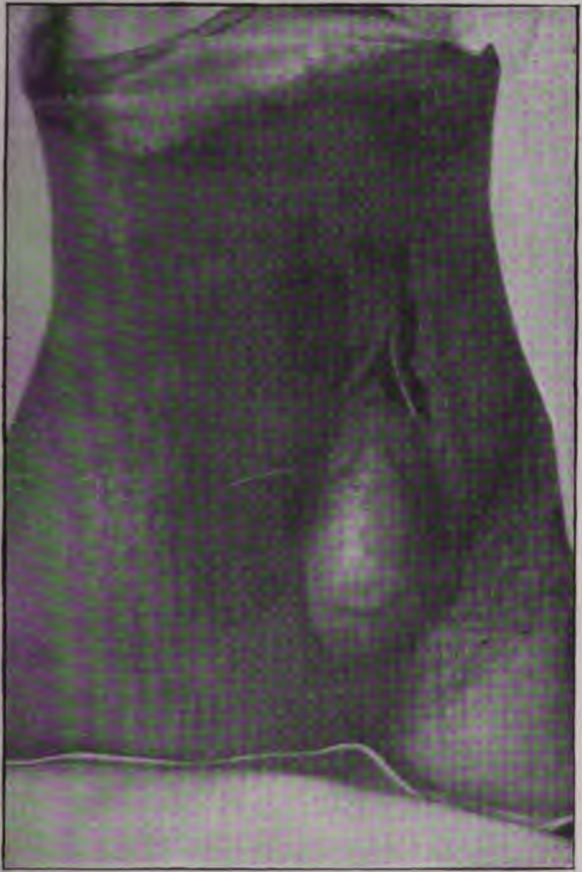


Fig. 289. Another case of Prolapse of the Uterus. The uterus comes still farther out.

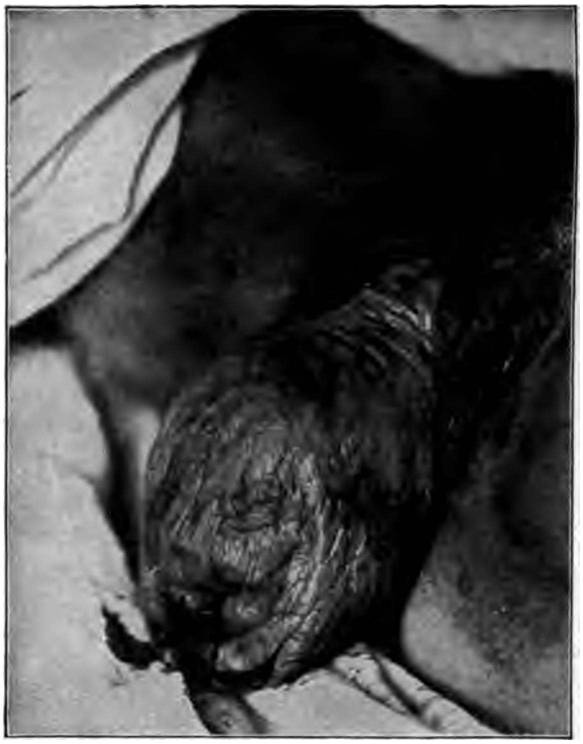


Fig. 290. Another case of Prolapse of the Uterus. The uterus and vagina lie outside the body. The ulceration, so frequent in these cases, is very evident. (Hirst—*Diseases of Women.*)

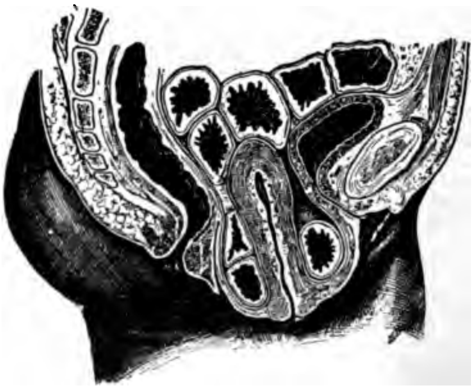


Fig. 291. Prolapse of the Uterus. Sectional view The bladder remains in place. (Kelly—*Operative Gynecology.*)

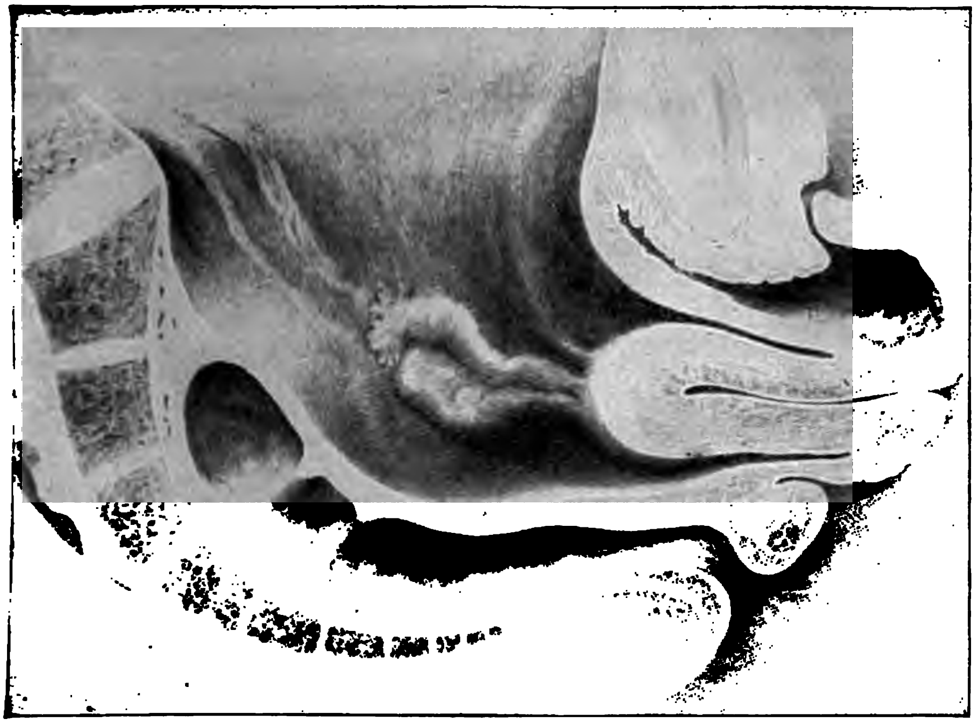


Fig. 292. Prolapse of the Uterus and Bladder. (Doderlein and Kronig—*Operative Gynakologie.*)

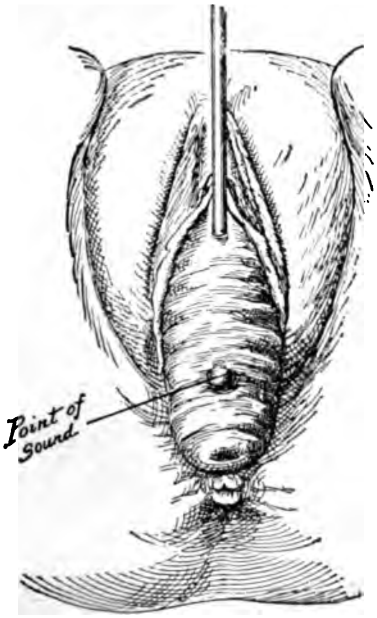


Fig. 293. Testing for Prolapse of the Bladder with the uterus, by means of a sound in the bladder. (Ashton—*Practice of Gynecology.*)

sizes and shapes, may appear on the exposed irritated surfaces. Such ulceratio shown in Fig. 290. Prolapse may occur in a woman who has never had a c (Fig. 294) or even in the virgin (Fig. 295). The position of the fundus is made by recto-abdominal palpation, as indicated in Fig. 296.

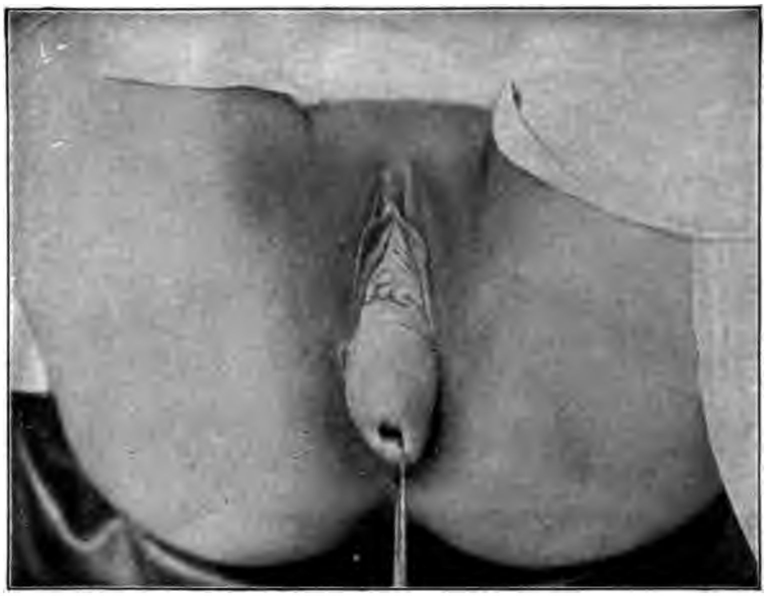


Fig. 294. Prolapse of the Uterus in a Nullipara. (Hirst—*Diseases of Women.*)

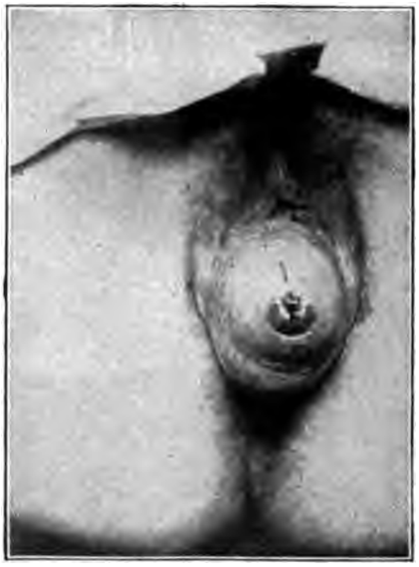


Fig. 295. Prolapse of the Uterus in a Virgin. (Kustner—*Kurzes Lehrbuch der Gynakologie.*)

Elongation of the Cervix produces a condition which is not infrequently mistaken for prolapse. If the hypertrophy affects only the infra-vaginal portion of the cervix (Fig. 297-a) the vaginal walls are not carried down but remain in normal position, producing the condition shown in Figs. 298 and 299. When the elongation affects the supra-vaginal portion (Fig. 297-c), both vaginal walls are carried down with the protruding cervix, producing a condition (Fig. 300) very likely to be mistaken for uterine prolapse, unless the depth of the uterine cavity be measured or the body of the uterus be carefully outlined by bimanual palpation. In these cases the dragging of the relaxed and redundant vaginal walls, seems to be an important factor in producing the elongation of the cervix. When the hypertrophy or stretching, as the case may be, affects the intermediate portion of the cervix (Figs. 297-b), the anterior vaginal wall is usually carried down while the posterior wall remains in place (Fig. 301). The time-honored division of the cervix into three portions, as indicated in Fig. 297, is convenient for fixing in mind the conditions ordinarily present in these cases,

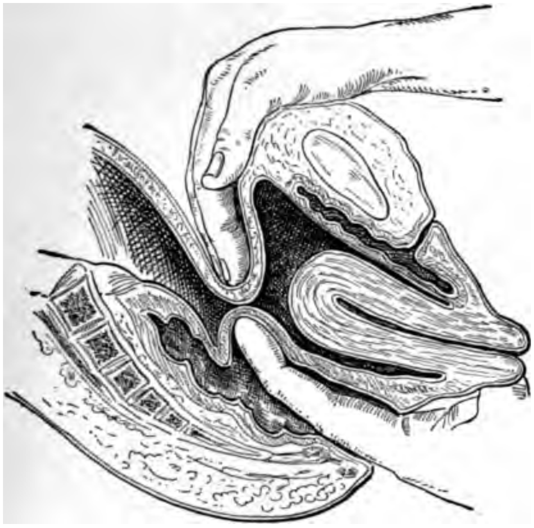


Fig. 296. Locating the body of the Uterus by recto-abdominal palpation, in a case of suspected Prolapse. (Ashton—*Practice of Gynecology.*)

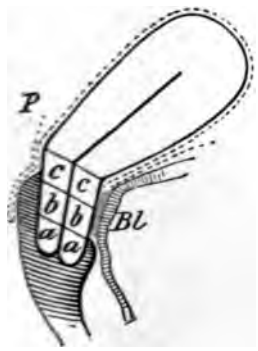


Fig. 297. The Three Divisions of the Cervix: (a) Infra-vaginal Portion. (b) Intermediate Portion. (c) Supra-vaginal Portion. (Byford—*Manual of Gynecology.*)

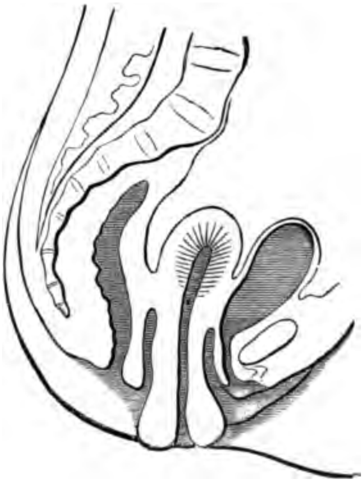


Fig. 298. Hypertrophy of the Infra-vaginal Portion of the Cervix. (Byford—*Manual of Gynecology.*)

but it must be remembered that in many cases the vaginal wall does not run very much further up on the

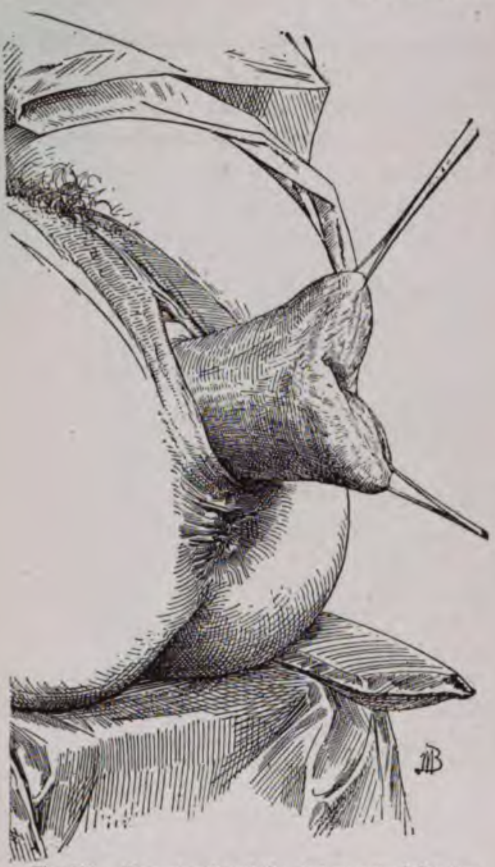


Fig. 299. Hypertrophy of the Infra-vaginal Portion of the Cervix. (Kelly—*Operative Gynecology*.)

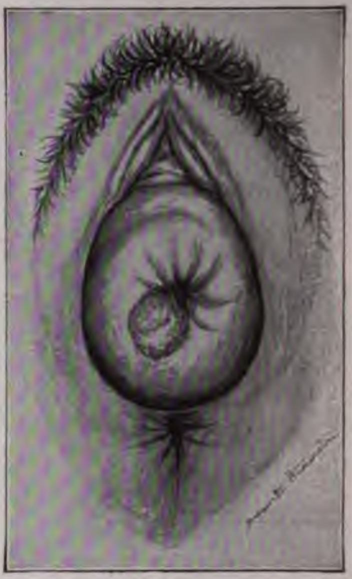


Fig. 300. Hypertrophy of the Supravaginal Portion of the Cervix, carrying down the vagina and cervix to the vulva. The uterine cavity in this case measures five and a half inches. An area of erosion is present on the posterior lip of the cervix. (Gilliam—*Practical Gynecology*.)

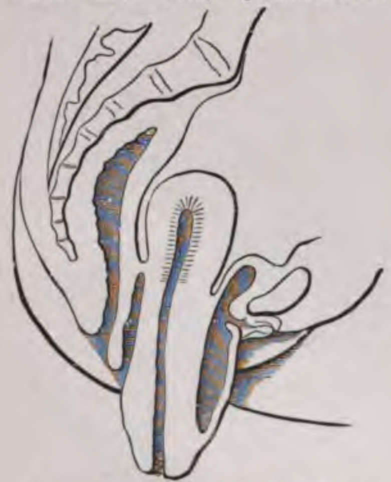


Fig. 301. Hypertrophy of the Intermediate Portion of the Cervix, carrying down the anterior vaginal wall and bladder but not the posterior vaginal wall. (Byford—*Manual of Gynecology*.)

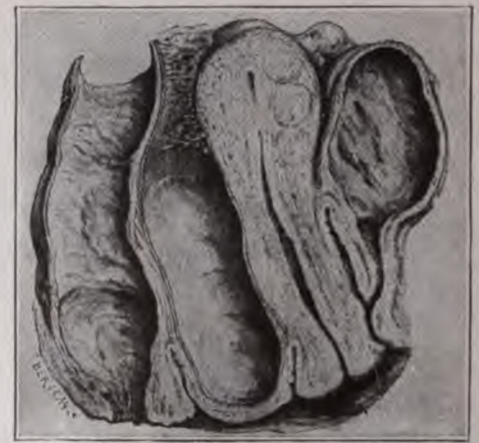


Fig. 302. A specimen presenting a peculiar Hypertrophy of the Cervix. The posterior vaginal wall is carried down but not the anterior. (Herman—*Diseases of Women*.)

posterior part of the cervix than it does on the anterior and, consequently, elongation of the middle or intermediate portion of the cervix does not always carry down the anterior vaginal wall and leave the posterior in place—in fact, in the case shown in Fig. 302, it has carried down the posterior wall and left the anterior.

The differentiation from prolapse of the uterus is made by locating the fundus uteri at about the normal position in the pelvis, by vagino-abdominal or recto-abdominal palpation, and, if necessary, by sounding the uterus to determine the length of the uterine cavity. In elongation, the cavity is increased in length sufficiently to account for the appearance of the cervix at the vulva. In prolapse of the uterus, there is usually some elongation of the supravaginal portion of the cervix by the dragging of the prolapsing vaginal walls, but it is of secondary importance.

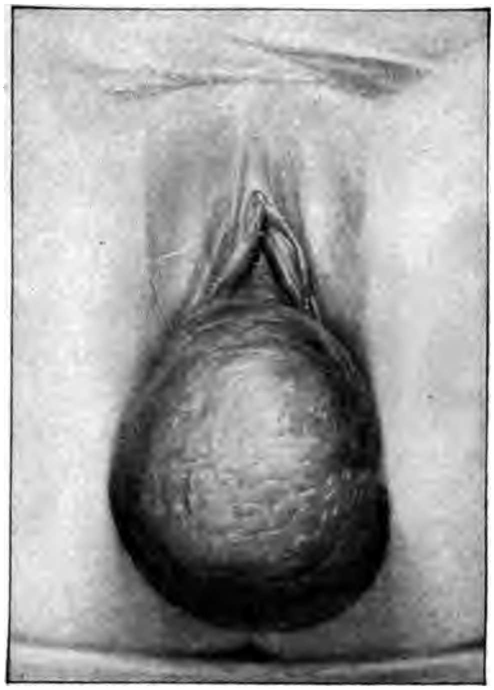


Fig. 303. Pediculated Fibroid Tumor of the Uterus, protruding at the vulva. (Kelly—*Operative Gynecology*.)

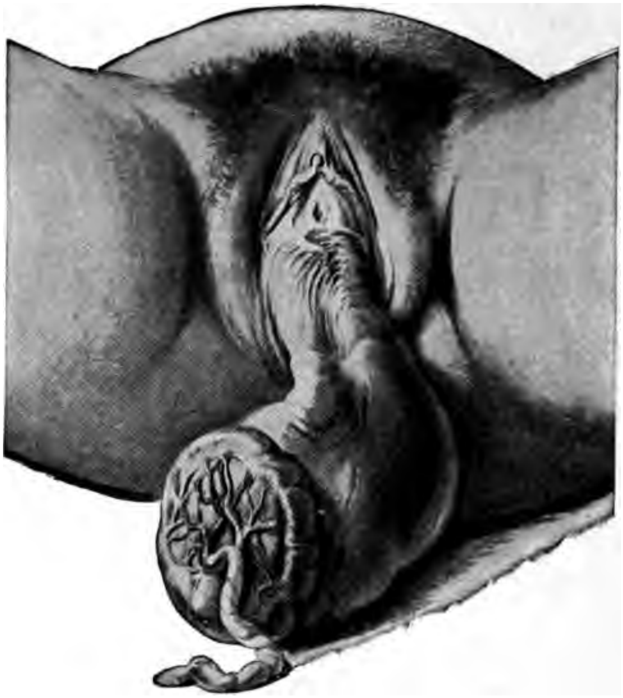


Fig. 304. Complete Inversion of the Uterus, forming a large mass at the vulva. This is a post-partum inversion and the placenta is still attached to the turned-out fundus uteri. (Williams—*Obstetrics.*)

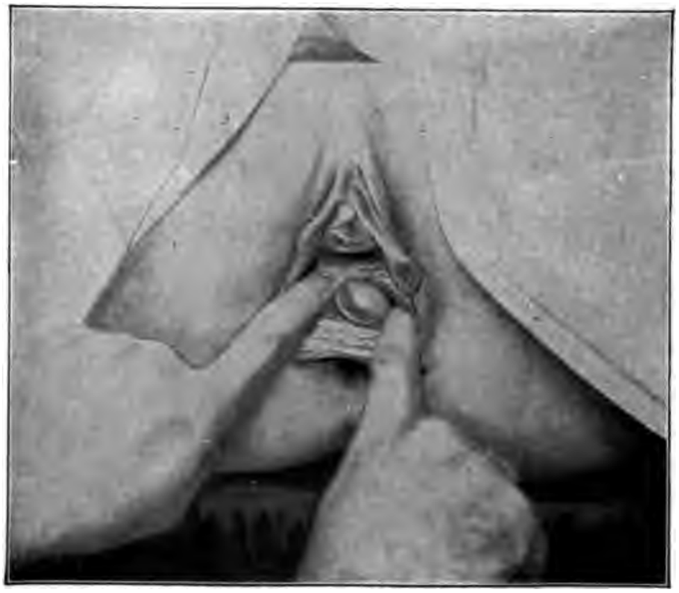


Fig. 305. A small Cyst of the Vaginal Wall. (Hirst—*Diseases of Women.*)

In the cases in which the elongation of the cervix is the principal lesion, there is usually some prolapse of the uterus, due to the dragging of the heavy cervix.

Tumor of Uterus. A mass appearing at the vulva, may be a pediculated fibroid (Fig. 303) or a malignant tumor from the uterus.

Inversion of Uterus (Fig. 304). This rare condition may produce an appearance very closely resembling a necrotic, bleeding tumor protruding from the vulva. The internal conditions are shown in Fig. 312.

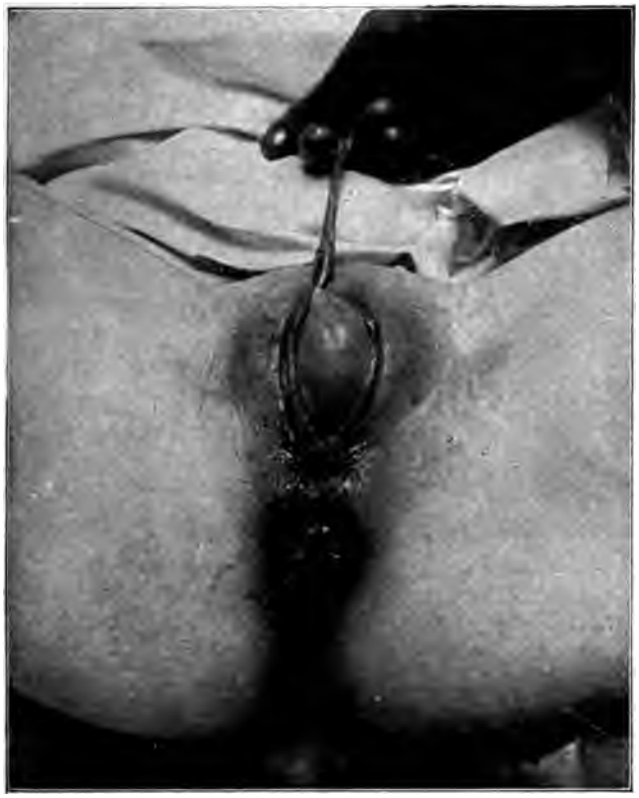


Fig. 306. A medium-sized Vaginal Cyst, caught with a forceps and brought into view. (Hirst—*Diseases of Women.*)

Vaginal Cyst. This may be confounded with cystocele or vaginal hernia or sub-urethral abscess. The differential diagnosistic points are the absence of inflammation, the distinct fluctuation, the tenseness of the sac containing the fluid and its attachment to some part of the vagina. Figs. 305 and 306 show such vaginal cysts.

POINTS IN THE VAGINAL EXAMINATION.

ROUGHENING OF VAGINAL WALLS.

Astringent Douche. Any astringent douche, for example, one containing alum or bichlorid, will cause temporary roughening of the vaginal wall. But there is no particular tenderness.

Inflammation. It is found in acute vaginitis, simple or gonorrhoeal, and in some cases of chronic vaginitis. In addition to the rough granular feel, there is tenderness of the wall, and the speculum examination shows reddening

TENDERNESS ON VAGINAL PALPATION.

Inflammation of Vaginal Entrance. The tenderness is noticed as soon as the examining finger begins to enter the vagina. There may be diffuse redness of the surface around the vaginal orifice or there may be simply reddened areas that are tender on pressure or there may be abrasions or slight fissures or there may be one or more distinct ulcers.

Inflammation of Vulvo-vaginal Gland or Duct. There is swelling and tenderness at the site of the gland and redness about the duct, and in some cases pus may be squeezed from the duct.

Hyperesthesia of Vaginal Entrance. There is great exaggeration of the reflex sensibility of the tissues immediately about the vaginal orifice, and yet no evidence of inflammation or fissure or ulcer or other adequate cause for pain. In some cases the reflex excitability is so great, that contact causes spasm of the levator ani and associated muscles to such an extent as to prevent the examination. This uncontrollable spasmodic closure of the vaginal orifice is known as " vaginisimus."

Inflammation of Vagina. There is purulent discharge and the vaginal walls are rough and hot. Speculum examination shows marked reddening of the walls (arterial congestion) and also discharge upon them.

Inflammation of Urethra. The tenderness is along the lower part of the anterior vaginal wall and is complained of when pressure is made along the course of the urethra. There may be distinct thickening about the urethra, which may be felt as a firm cord beneath the public arch. In most cases there is redness about the meatus, and some discharge may be pressed out by compressing the urethra from above downward (Figs. 46, 47).

Inflammation or Other Painful Affection of the Bladder. Pain is caused by pressure upward along the middle of the anterior vaginal wall, which lies against the base of the bladder. There are also the symptoms of bladder irritation (frequent urination, painful urination), and also the findings on urinary analysis.

Inflammation or Other Painful Affection of the Rectum. Pain is caused by pressure backward along the posterior vaginal wall (Fig. 60). There is also evidence of rectal irritability (pain on defecation, rectal tenesmus), and possibly the passage of blood or mucus.

Inflammation Around Uterus (cellulitis, salpingitis, pelvic peritonitis). Pain is caused by pressure on the vaginal wall around the uterus, either in front of the cervix or behind it or at one side. Pain is caused also by any attempt to move the uterus, as by pushing on the cervix.

MASS FELT IN VAGINAL PALPATION.

Prolapsed Vaginal Wall (colpocele). The vaginal wall is more redundant than it ought to be and part of it descends toward the opening. It may be the anterior vaginal wall (anterior colpocele) or the posterior vaginal wall (posterior colpocele) (Fig. 239) or both. The mass presents the characteristics of relaxed vaginal wall. There is no distinct firm body in it.

Prolapse of Bladder (cystocele). In some cases of prolapse of the anterior vaginal wall, the bladder follows the vaginal wall (Fig. 241). This is known as cystocele, as previously explained. The bladder wall is soft and therefore can not be felt distinctly in the mass, as the uterus can. It is noticed, however, that there is much more soft tissue in the mass than would be furnished by the prolapsed vaginal wall and, as the bladder lies next to the vagina, it is to be assumed that this extra tissue is bladder wall. Sometimes there is enough urine in the prolapsed pouch of bladder to give fluctuation. Usually there is some bladder irritability (frequent, painful urination), and in some cases the patient has found that she must push back the mass each time before she can urinate satisfactorily. If there is still doubt as to whether or not the bladder descends with the vaginal wall, and it is important to know certainly, introduce a steel urethral bougie (about No. 20F) and see if the tip passes easily into the mass (Fig. 243).

Prolapse of Anterior Wall of Rectum (rectocele). The anterior wall of the rectum may follow the posterior vaginal wall in its descent through the vaginal orifice (Figs. 244, 245). A digital examination per rectum will quickly show whether or not the cavity of the rectum extends into the mass (Figs. 246, 247).

Prolapse of Uterus (Fig. 287). The cervix is felt much lower (closer to the vaginal entrance) than normal, or it may present at the vaginal orifice or even project far outside (Fig. 289). Bimanual examination shows that the body of the uterus also is lower than usual (Fig. 296), and consequently that the condition is prolapse of the uterus and not simply elongation of the cervix.

Elongation of Cervix. The cervix is felt much lower than it ought to be. Bimanual examination shows that the body of the uterus is in normal position. If the bimanual examination does not make plain the length and position of the body of the uterus, the uterus may be sounded. This will show that the length of the uterus is sufficient to account for the low position of the cervix. In some cases the two conditions, prolapse of the uterus and elongation of the cervix, are both present.

Tumor of Uterus. There is a solid or semi-solid mass lying in the vagina (Figs. 307, 308, 309, 310, 311). The finger may be passed all around, between the mass and the vaginal wall. When the finger is passed around the mass, its connection with the cervix is felt. It may spring from a portion of the cervix within reach, or it may be connected with a pedicle extending up into the canal.

Inversion of Uterus (Fig. 312). There is a mass the size of the uterus lying in the

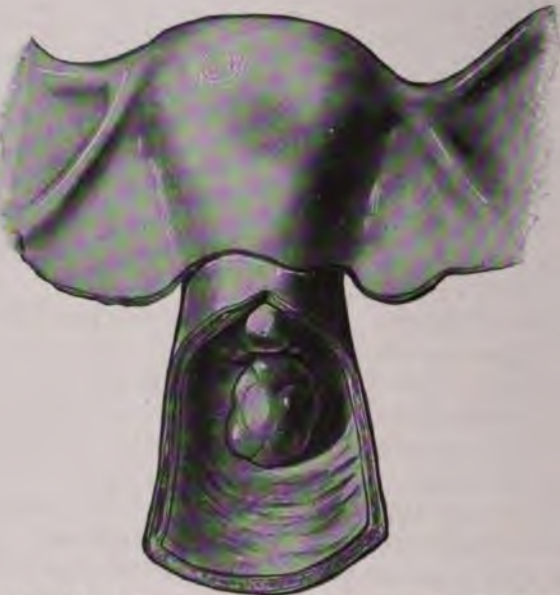


Fig. 307. A small Pediculated Fibroid of Uterus, projecting into the vagina. (Montgomery—*Practical Gynecology*.)

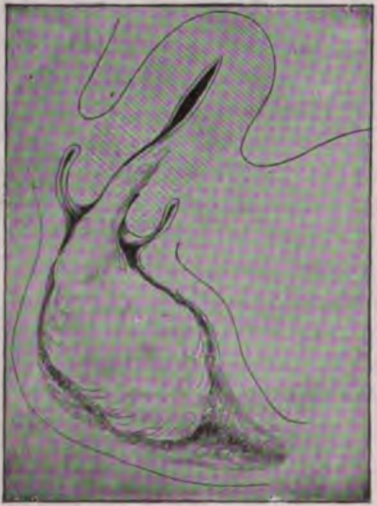


Fig. 308. A large Pediculated Uterine Fibroid lying in the vagina. (Thomas and Munde—*Diseases of Women*.)

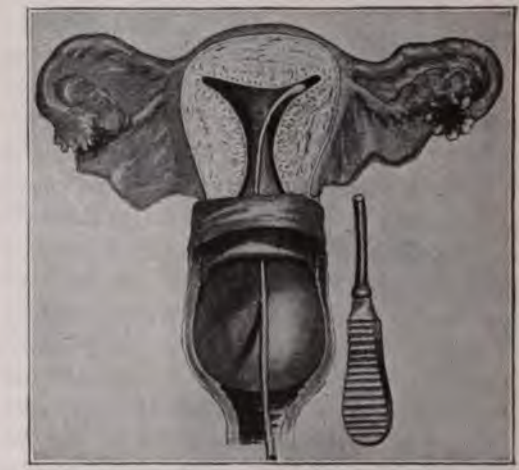


Fig. 309. A Pediculated Fibroid, with the sound in place to differentiate it from inversion of the uterus. (Dudley—*Practice of Gynecology*.)

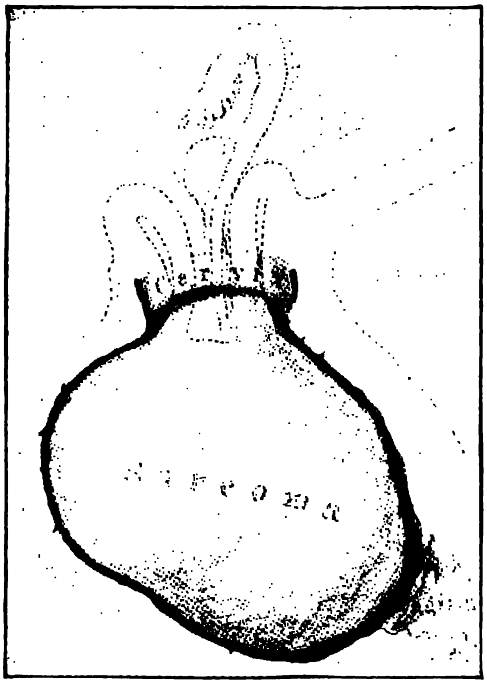
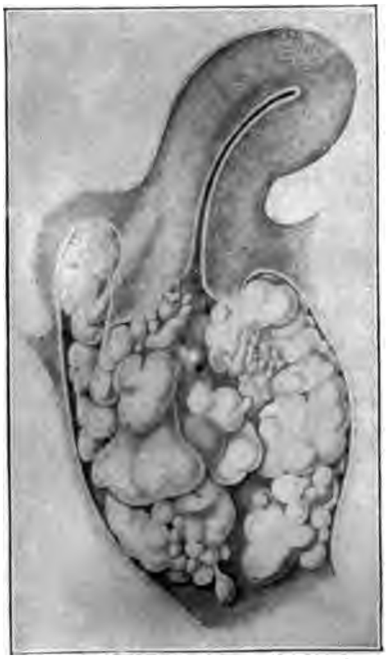


Fig. 310. A Sarcoma of the Uterus projecting into the vagina and causing partial inversion of the uterus. (Kelly—*Operative Gynecology.*)



311. Grape-like Sarcoma springing from the Cervix uteri and forming a mass in the vagina. (Kustner—*Kurzes Lehrbuch der Gynakologie.*)

vagina, having a raw looking mucous surface exposed. Palpation of the upper part of the mass shows that it is connected with the cervix by a broad pedicle, and the dilated cervical ring may be felt around it. Figs. 313 to 321 give a clear idea of inversion and conditions that may be confounded with it.

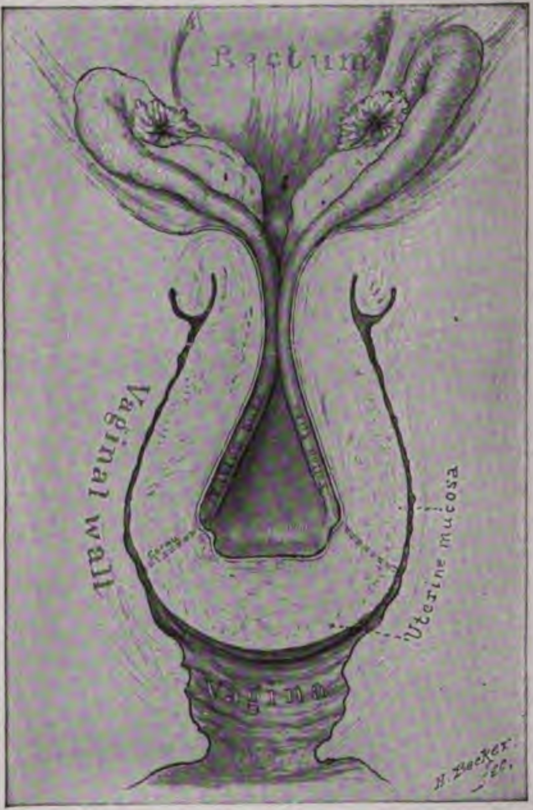


Fig. 312. Inversion of the Uterus, forming a mass in the vagina. (Kelly—*Operative Gynecology.*)

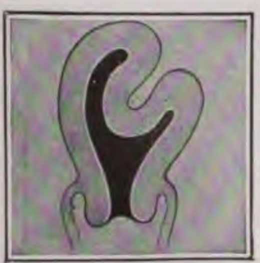


Fig. 313. Begining Inversion of the Uterus.

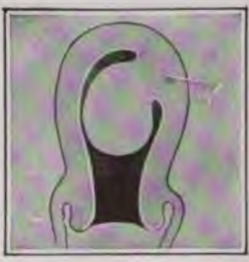


Fig. 314. Submucous Fibroid with short pedicle.

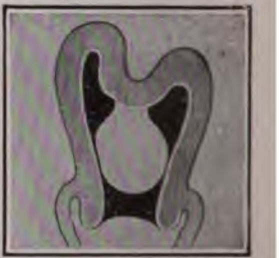


Fig. 315. Submucous Fibroid and beginning Inversion.

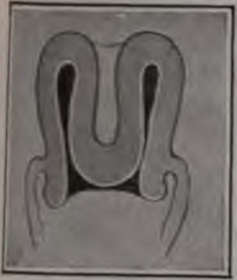


Fig. 316. Partial Inversion of Uterus.

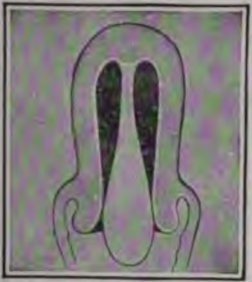


Fig. 317. Submucous Fibroid with long pedicle.

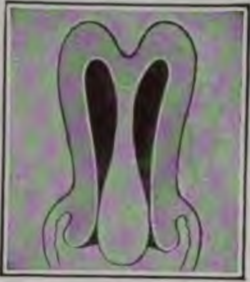


Fig. 318. Pediculated Fibroid and partial Inversion.

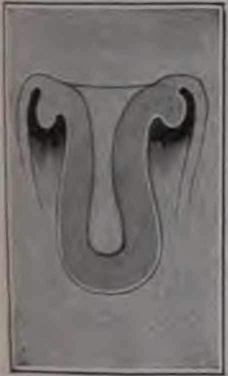


Fig. 319. Complete Inversion of Uterus.

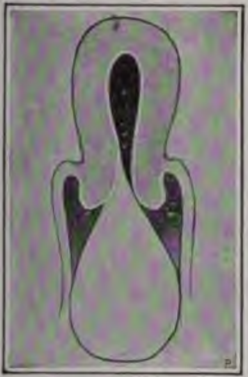


Fig. 320. Pediculated Fibroid filling upper part of vagina.

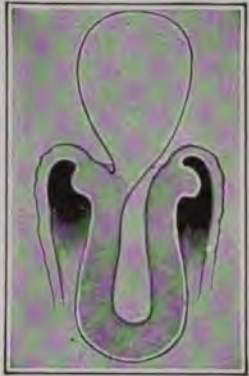


Fig. 321. Complete Inversion of Uterus, with a pediculated subperitoneal Fibroid occupying the normal site of the uterus.

Figs. 316 to 321. INVERSION OF THE UTERUS AND CONDITIONS THAT SIMULATE IT. (Dudley—*Practice of Gynecology.*)

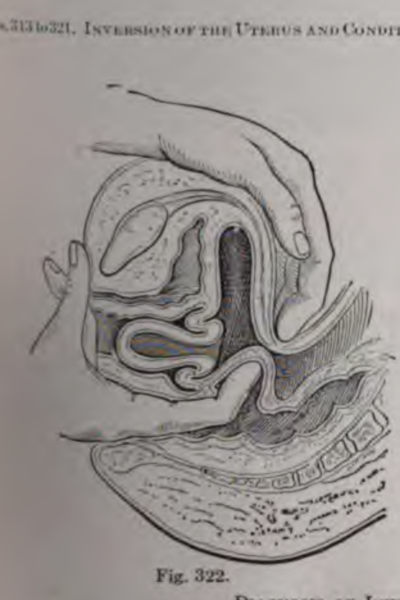


Fig. 322.

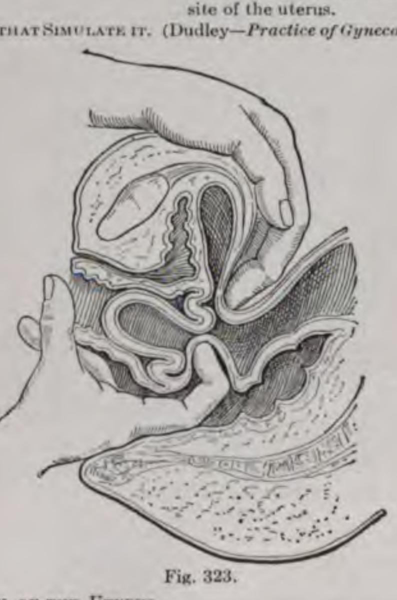


Fig. 323.

DIAGNOSIS OF INVERSION OF THE UTERUS.

Fig. 322 shows the method of determining the absence of the body of the uterus from the pelvic cavity. Fig. 323 shows the determination of the presence of a cup-shaped depression above the cervix. (Ashton—*Practice of Gynecology.*)

Bimanual examination (under anesthesia, if necessary) shows the body of the uterus absent from where it should be (Fig. 322), and instead there is a cup like depression above the cervical ring (Fig. 323). Also, a sound will not pass up into the uterine cavity but is stopped on all sides a short distance within the cervical opening (Fig. 324). There may be inversion associated with a tumor (Fig. 325).

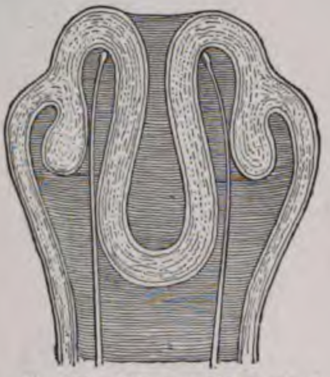


Fig. 324. Differential Diagnosis of Inversion by means of the sound. On all sides the sound is stopped a short distance within the cervix. (Ashton—*Practice of Gynecology.*)

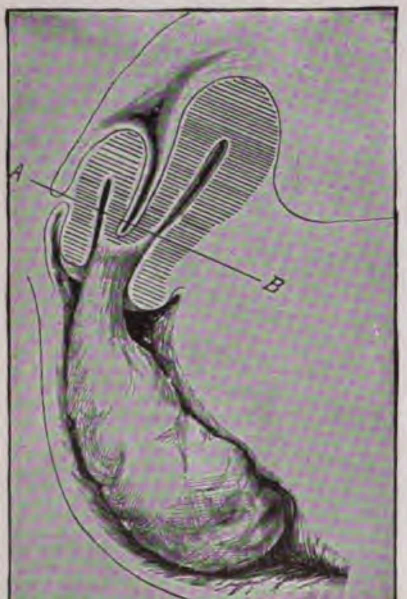


Fig. 325. A Pediculated Fibroid Causing Inversion of the Uterus. This shows also a danger to be avoided in treatment. Amputation of the fibroid by cutting across the pedicle at the level of the line A, B, would open the peritoneal cavity. (Thomas and Munde—*Diseases of Women.*)

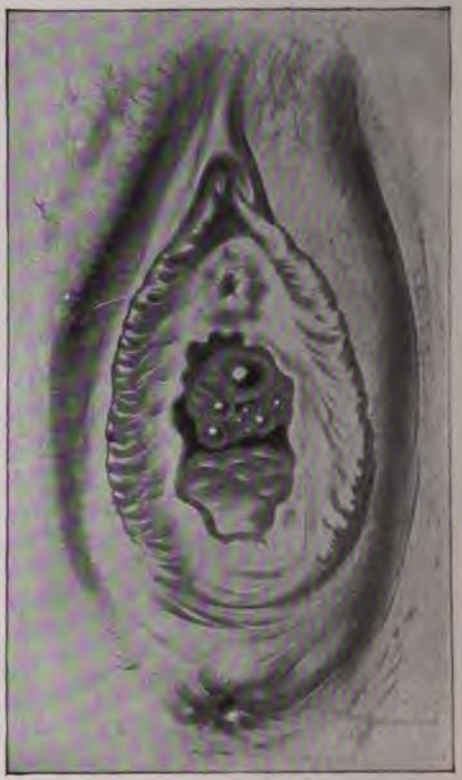


Fig. 326. A group of small Cysts of the Vaginal Wall. (Montgomery—*Practical Gynecology.*)

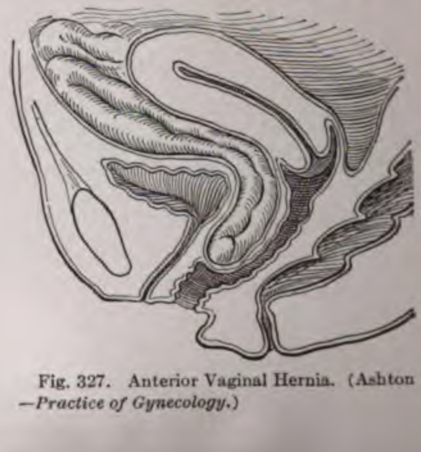


Fig. 327. Anterior Vaginal Hernia. (Ashton—*Practice of Gynecology.*)

Tumor of Vaginal Wall. This is usually a cyst. A rounded mass containing fluid is felt and, tracing it up, it is found to be attached to the vaginal wall (Fig. 326). It can not be reduced into the peritoneal cavity like a hernia, neither is there any evidence of any obstructive bowel disturbance. Solid tumors of the vaginal wall sometimes occur.

Vaginal Hernia (Fig. 327). This is felt as a soft elastic mass, causing projection of the vaginal wall. It can be reduced into the peritoneal cavity but returns when the patient coughs or bears down. It disappears when the patient is in the knee-chest posture, unless strangulated or incarcerated. There may or may not be symtoms of intestinal obstruction, partial or complete.

Abscess Pushing Vaginal Wall Inward. Such an abscess may arise in the connective tissue beside the cervix or in the posterior cul-de-sac or in front of the cervix or as an ischio-rectal abscess. It may arise also in the recto-vaginal septum.

Rectum Distended with Fecal Masses. If the fecal masses are in the lower part of the rectum their character is apparent, but if in the upper part of the rectum, back of the uterus, they may be confused with other masses. The characteristics of such a fecal mass are that it is situated in the course of the rectum, that it is not particularly tender, that it has a putty-like consistency and may be indented by the examining finger and the dent remains, that it may be moved along to a different part of the rectum and that an enema removes it.

Tumor of Rectum. There is a mass felt through the posterior vaginal wall. There are the evidences of rectal irritation and also the facts that may be made out on rectal examination.

Tumor of Bladder. A mass is felt through the anterior vaginal wall. There are the evidences of bladder irritation (frequent, painful urination) and also the urinary findings.

Mass in Cul-de-Sac of Douglas. This is felt back of the cervix and may be a retroflexed uterus (Fig. 393), a tumor (Fig. 392), a prolapsed ovary or tube (Fig. 391), an inflammatory exudate (Fig. 401), an abscess or a hematocele.

CHANGES IN CERVIX UTERI FELT ON VAGINAL EXAMINATION.

Displacement of Cervix. Forward Displacement (pointing forward) may be due to backward displacement of the uterus (Figs. 328, 329), to anteflexion of the cervix (Fig. 330) or to an inflammatory mass or a tumor back or the cervix pushing it forward. Backward Displacement may be due to a distended bladder (Fig. 344), or a tumor of the bladder, to an inflammatory mass or a tumor in the front part of the cervix pushing it backward or to old adhesions back of the cervix pulling it backward. Lateral Displacement of the cervix may be due to an inflammatory mass, a blood mass or a tumor at the side of the cervix pushing it toward the opposite side, or to old adhesions or to scar tissue in the vaginal wall on one side pulling the cervix to the same side.

Enlargement and Distortion of the Cervix may be caused by inflammation with eversion of mucosa (Fig. 331),or by laceration with eversion of mucosa (Figs.332 to 337),or by chronic inflammatory infiltration and obstruction of gland ducts from

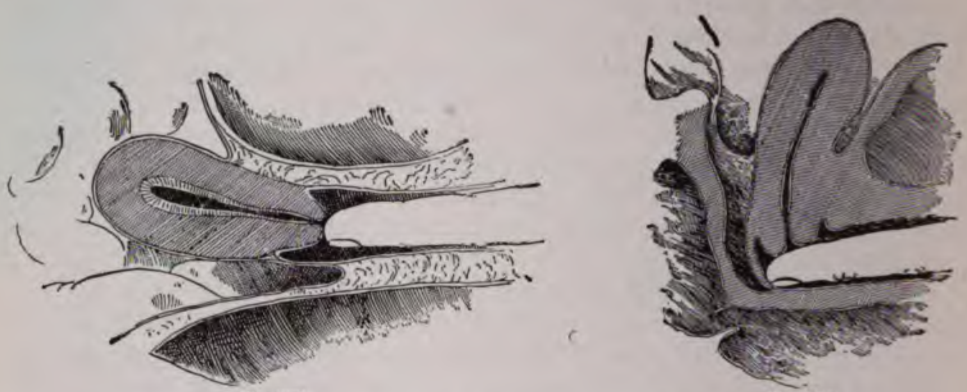


Fig. 328. Fig. 329.

THE RELATION OF THE CERVIX TO THE EXAMINING FINGER.

Fig. 328. Retroversion of the Uterus, showing the Relation of the Cervix to the examining finger. Compare this with Fig. 329, which shows the relation of the cervix to the examining finger when the uterus is in normal position. (Keating and Coe—*Clinical Gynecology*.)

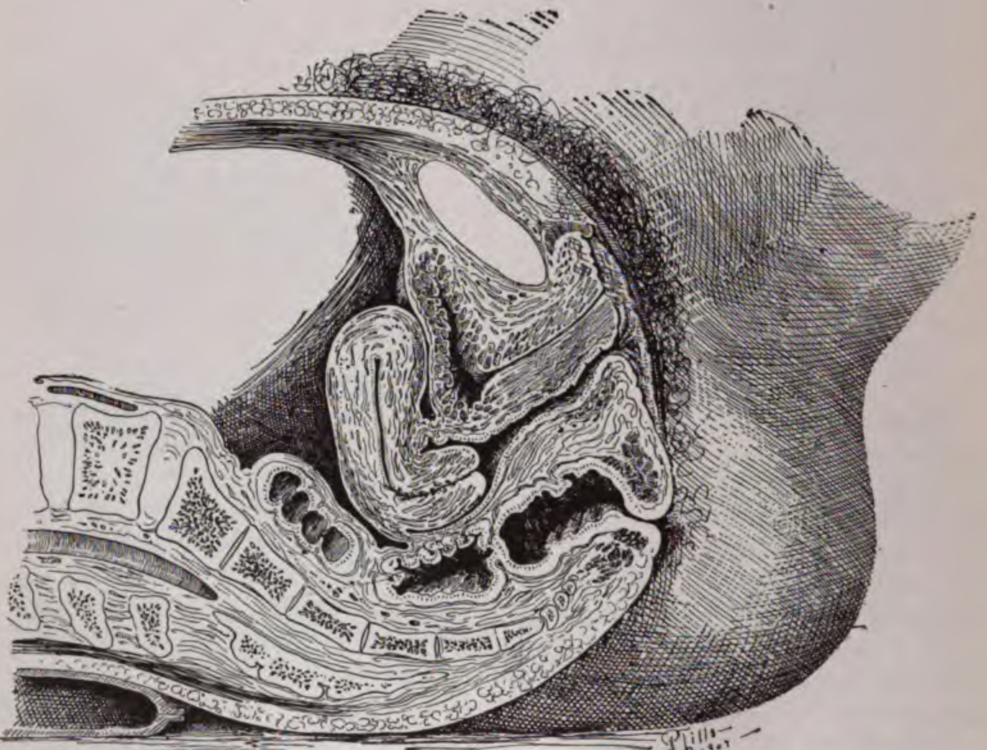


Fig. 330. Anteflexion of the Cervix Uteri. In this condition the axis of the cervix points TOWARD the examiner, as in retroversion, though the corpus uteri is well forward.

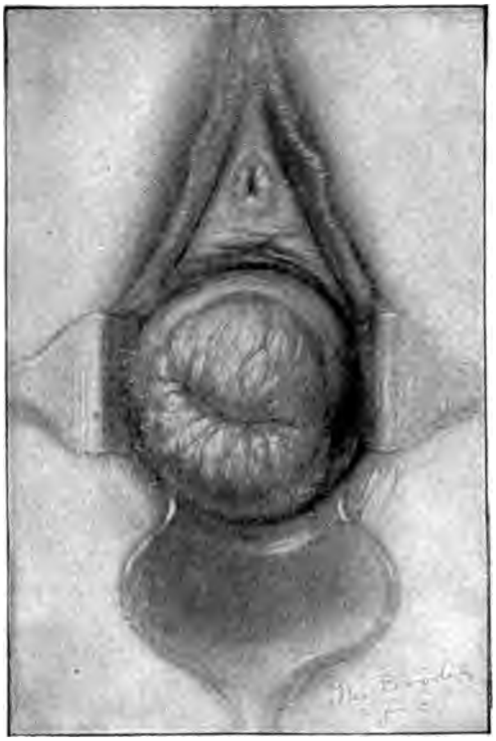


Fig. 331. Eversion of the Cervical Mucosa due to inflammation within the cervix. (Cullen—*Cancer of the uterus.*)

There has been no laceration of the cervix in this case, the patient being a Nullipara. This eversion of the cervical mucosa by inflammation only, without previous laceration, is a rare condition. It is likely to lead to a mistaken diagnosis of laceration of the cervix. It is also of medico-legal importance, as the appearance of laceration may lead to the erroneous conclusion that the patient has at sometime given birth to a child.

scar-tissue, causing cystic degeneration (Fig. 337), or by a fibroid tumor of the ce-vix or by a malignant tumor of the cervix. Idiopathic elongation of the cervi also, may cause it, but that is a very rare condition.

Softening of the Cervix may be due to normal pregnancy or to extra-uteri pregnancy or to a recent pregnancy (terminated by labor or miscarriage). In F

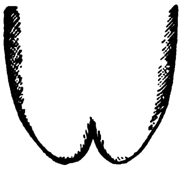


Fig. 332.

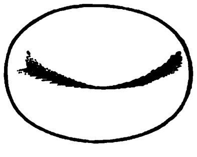


Fig. 333.

Figs. 332 and 333, Side and Front Views of a Simple Bilateral Laceration, requiring no treatment.

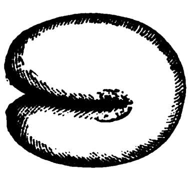


Fig. 334. Front view of a Unilateral Laceration requiring no treatment.

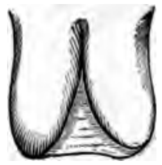


Fig. 335. Side View of a Unilateral Laceration. Such a laceration may cause abortion in the early months of pregnancy.

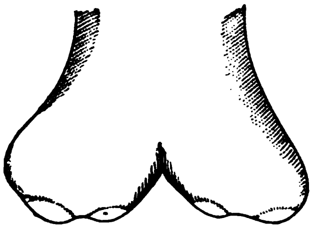


Fig. 336. Side View of a Bilateral Laceration, requiring treatment. The lips are everted, and the Nabothian follicles stand out as small hard lumps.

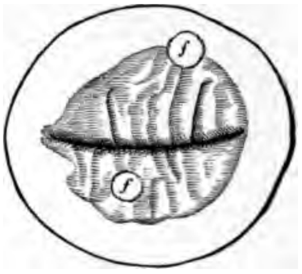


Fig. 337. Front View of a Bilateral Laceration, showing eroded area and Nabothian follicles.

Figs. 332 to 337. Lacerations of the Cervix Uteri. (Baldy—*American Text-book of Gynecology.*)

338, the softened portion is represented by the dotted area. This feels soft, like the vaginal wall or like velvet, as explained in chapter I. It has been aptly said that "the cervix normally has about the consistency of the tip of the nose. When it is as soft as the lip, look out for pregnancy." This softening begins at the lower part of the cervix in the first few weeks of pregnancy and gradually progresses upward until, in the last month, the whole cervix is so softened that it is sometimes hardly felt in the examination. That this is a softening, and not a shortening as was formerly supposed, is shown in Fig. 339, where it is seen that the cervix at term is still of normal length. Occasionally marked chronic congestion, from the presence of a tumor or inflammatory mass, will be accompanied by some softening or the cervix.

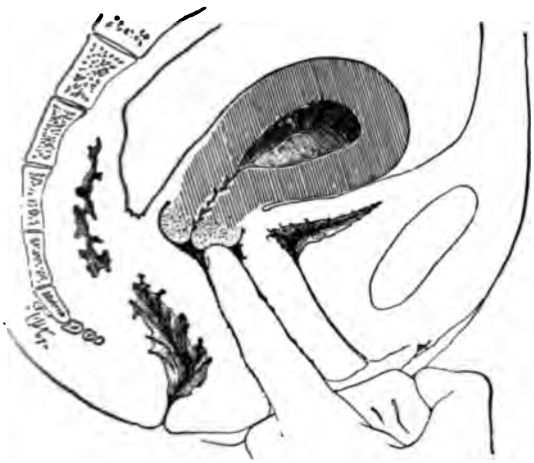


Fig. 338. Palpating the Cervix to Determine Softening. The light stippled area represents the softened portion. The uterus is represented as enlarged from early pregnancy.

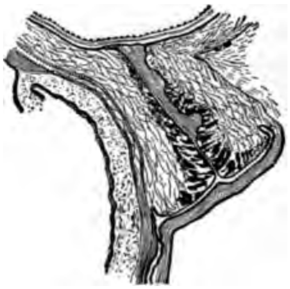


Fig. 339. Section of the Cervix, in pregnancy at term, showing that the cervix is still of Full Length. The sensation of shortening imparted to the examining finger is due to the softening, causing the lower part to be not easily appreciated by the finger. (Dickinson, after Waldoyer—*American Text book of Obstetrics.*)

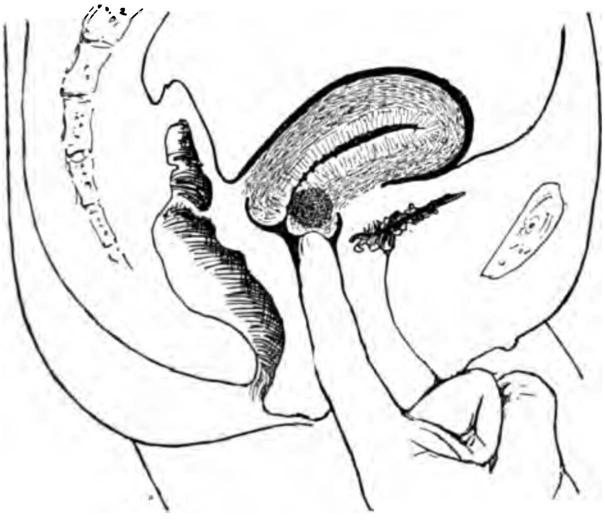


Fig. 340. Beginning Carcinoma within the Cervix, causing a Hard Nodule, which can be felt on digital examination (Kelly—*Operative Gynecology.*)

Hard Nodule in the Cervix may be due to scar tissue from laceration, to a fibroma, to beginning malignant disease (Fig. 340) or to a glandular cyst (Fig. 341). In scar tissue, the induration corresponds with the scar and follows the course of the scar, and it does not increase in size under observation. In cystic disease (Figs. 560, 341), if the nodule be punctured and pressed upon, the characteristic clear glairy substance will be extruded and the induration will largely disappear. In fibromyoma, fibroids elsewhere in the uterus may be found, making it probable that the cervical nodule is similar in nature. A nodule in the cervix that does not correspond with any of the conditions just mentioned, may be beginning malignant disease. A piece of it should be excised and submitted to microscopic examination, to establish certainly the diagnosis at a time when a diagnosis will do some good.

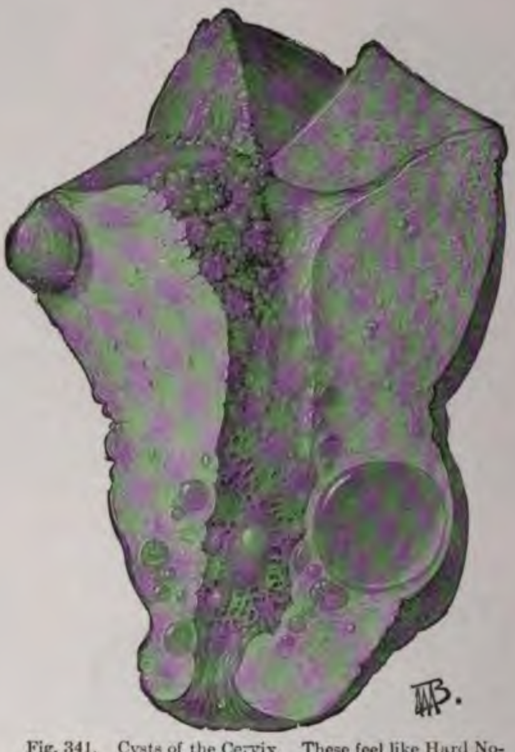


Fig. 341. Cysts of the Cervix. These feel like Hard Nodules and hence may lead to a mistaken diagnosis of malignant disease in the cervix, as happened in the case from which this specimen was taken. At operation the carcinoma (which was diagnosed from curettings) was found to be confined to the corpus uteri, as shown in the specimen, instead of extending to the cervix as was previously supposed. (Kelly—*Operative Gynecology.*)

Tenderness of the Cervix usually means inflammation around the uterus. The tissue of the cervix is ordinarily not painful to pressure even when diseased. The tenderness so often complained of when pressure is made on the cervix, is usually due to a slight involvment around the uterus and consequent pulling on inflamed peri-uterine tissues due to the moving of the uterus.

Fixation of the Cervix may be due to inflammatory exudate, to a tumor about the uterus or to scar tissue in the upper part of the vagina.

Abnormal Mobility of the Cervix is due to stretching of the supporting tissues around it and of the pelvic floor below it.

MASS FELT IN CERVICAL CANAL.

On palpating the cervix some one of the following small masses may in some cases be felt just within the external os or projecting slightly from it.

Blood Clot. This is soft and easily broken, if it projects far enough to permit of its being caught between the fingers. When it is up in the canal so that only the

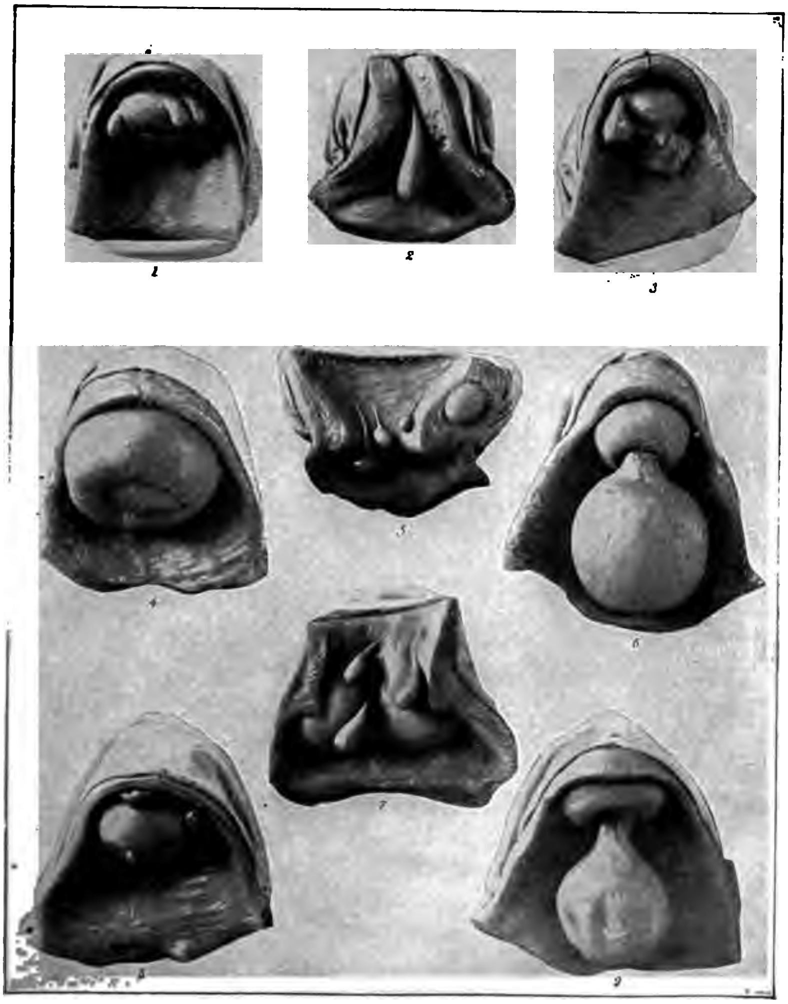


Fig. 342. Mucous Polypi of the Cervix. (Hirst—*Diseases of Women.*)

lower edge or end can be felt, it may feel very much like a piece of tissue. Introduce the uterine dressing forceps beside the finger and catch the small mass and bring it outside for inspection.

Placental Remnants. In incomplete miscarriage a small piece of tissue may often be felt in the cervical canal, showing that there are retained remnants that must be removed. It is in this same class of cases that a firm blood clot in the cervix may lead to an erroneous diagnosis, hence the importance of removing the small mass with a forceps so that it may be examined to determine certainly whether it is a piece of tissue or only a blood clot. To determine if it has the bushy projections of placental tissue, spread it out in water. If it is of doubtful character, submit it to microscopic examination. It may be a broken off papillary mass from a malignant growth in the uterus.

Mucous Polypus. Mucous polypi are frequently found projecting from the cervix or up in the canal (Fig. 342). They may be so soft as to be hardly noticed in the digital examination but, when projecting from the canal, are very apparent in the speculum examination.

Fibrinous Polypus. This is a polypus which has gradually enlarged from accretions of fibrin about a placental remnant or other small mass in the uterine cavity. Its character is determined by microscopic examination.

Fibroid Polypus (Fig. 307). This is a small pediculated submucous fibroid, the pedicle of which has become stretched sufficiently to permit the mass to appear at the external os or to project from the same. It may be attached in the body of the uterus or in the cervix, usually the former.

Malignant Polypus. A malignant growth in the cervix or in the body of the uterus may send out a papillary projection that appears at the external os as a polypus. Again malignant change may be present in, or may develop in, apparently simple polypi. For this reason all polypi of whatever kind removed from the cervix should be preserved that their exact character may be determined by microscopic examination.

POINTS IN THE VAGINO-ABDOMINAL EXAMINATION.

CHANGES IN CORPUS UTERI.

Backward Displacement of the Uterus (Fig. 343). The body of the uterus is not made out in front (Fig. 69). In the back part of the pelvis there is felt a body, apparently continuous with the cervix, and of the size, shape and consistency of the corpus uteri (Figs. 70, 71). It may be movable or fixed, tender or not tender. No other mass is felt in the pelvis. Such a mass is in all probability the body of the uterus in backward displacement. If some of the necessary points can not be made out distinctly and there are circumstances which make it important to know at once the exact location of the corpus uteri, this may be determined certainly by introducing the sound into the uterus. But do not use the sound except when there is some special reason for doing so, and remember the contra-ind sounding given in chapter I.

This retro-displacement of the body of the uterus may be due to a full bladder (Fig. 344) or to an inflammatory mass in the front part of the pelvis or to a tumor. On the other hand, the displacement itself, with or without an accompanying inflammatory trouble, may be the principal lesion.

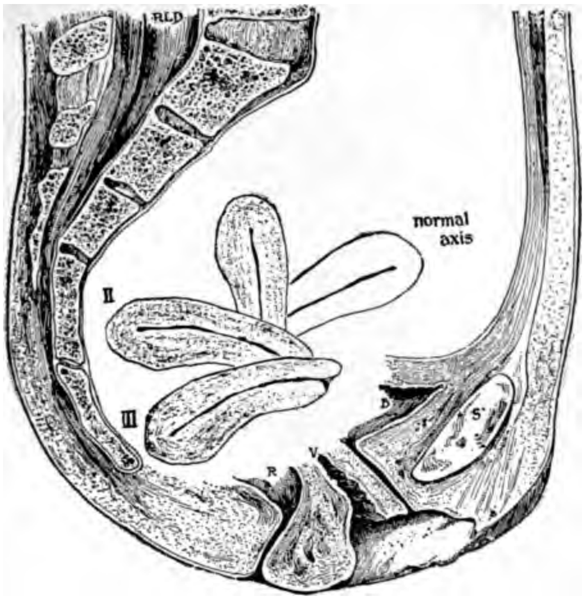
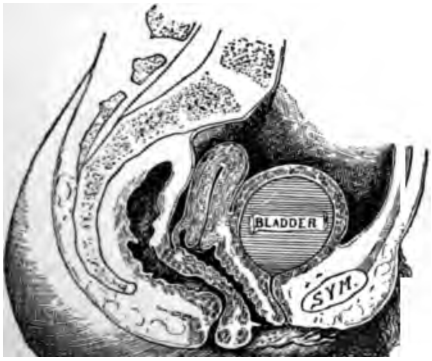


Fig. 343. Retrodisplacement of the Uterus, showing the first, second and third Degrees. (Skene—*Diseases of Women.*)

Forward Displacement of the Uterus. Forward displacement of the body of the uterus may be due to the body of the uterus being heavy and softened, as in early pregnancy (Fig. 348) and also in certain inflammatory conditions, or to an inflammatory mass or a tumor pushing the fundus forward and downward.

Lateral Displacement of the Uterus may be caused by an inflammatory mass (Fig. 345) or by blood a mass (Fig. 387) or by a tumor (Fig. 346), pushing the uterus toward the opposite side. It may be due also to



[illegible] laced backward by a Practical Gyne-

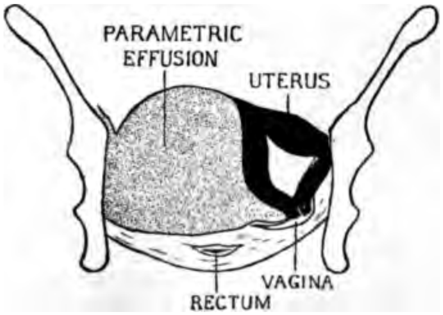


Fig. 345. Uterus displaced laterally by an Inflammatory Mass. (Edgar—*Practice of Obstetrics.*)

old adhesions drawing the uterus to the side (Fig. 347), or it may be due simply to a heavy uterus leaning to the side.

Slight Enlargement of the Uterus may be caused by early pregnancy. There is usually decided anteflexion of the softened uterus in this early stage (Fig. 348).

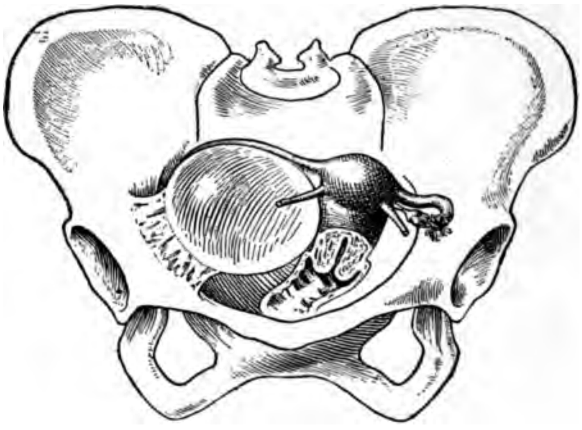


Fig. 346. Uterus pushed to the left side by a Tumor or Inflammatory Mass in the opposite side. (Findley — *Diagnosis of Diseases of Women.*)

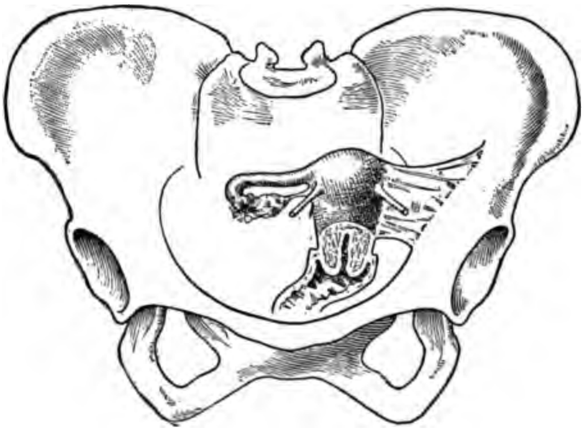


Fig. 347. Uterus Drawn to the left side by Adhesions or Infiltration in the same side. (Findley—*Diagnosis of Diseases of Women.*)

Occasionally there is backward displacement of the pregnant uterus (Figs. 349, 350). From about the sixth to the twelfth week there is a peculiar softening and compressibility of the lower portion of the body of the uterus which contrasts markedly with the less compressible portion above. This is known as Hegar's

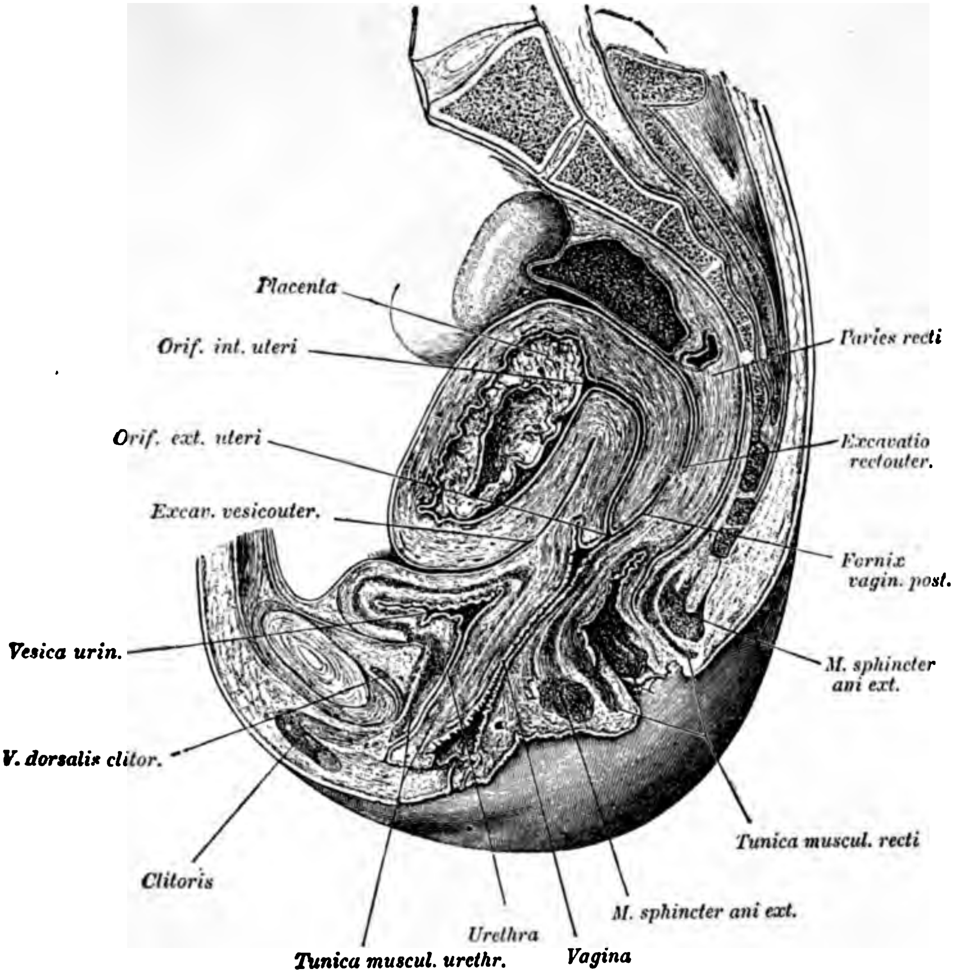


Fig. 348. Frozen Section of a body showing the Uterus Enlarged from early Pregnancy. Notice the sharp anteflexion of the softened uterus. (Waldeyer—*Das Becken.*)

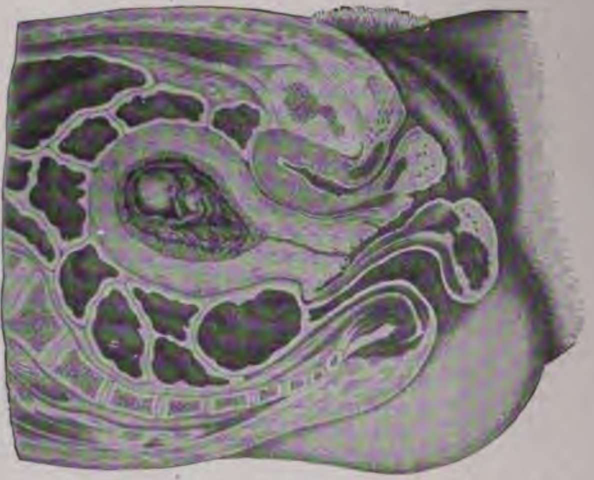


Fig. 349. Early Pregnancy with Retrodisplacement of uterus. (Edgar—*Practice of Obstetrics.*)

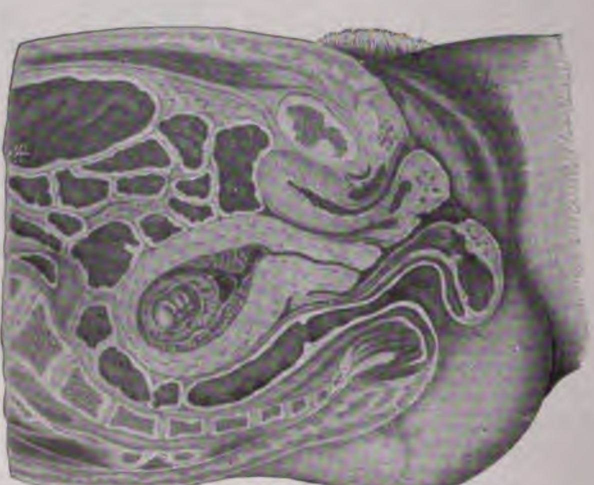
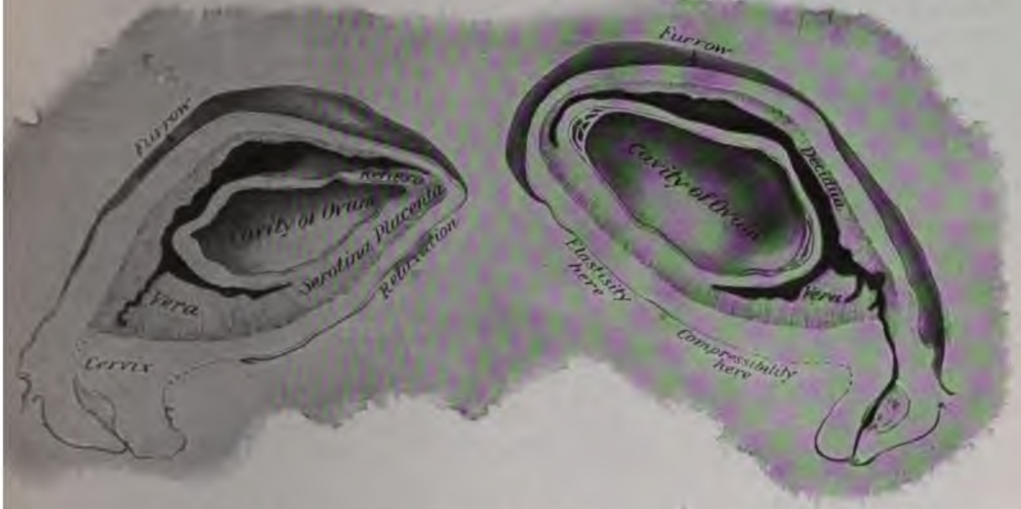


Fig. 350. Early Pregnancy with a more marked Retrodisplacement of the uterus. (Edgar—*Practice of Obstetrics.*)



g. 351. A Sectioned Uterus in early Pregnancy, showing the two halves and the interior arrangement which gives ar's Sign. (Edgar, after Pinard—*Practice of Obstetrics.*)

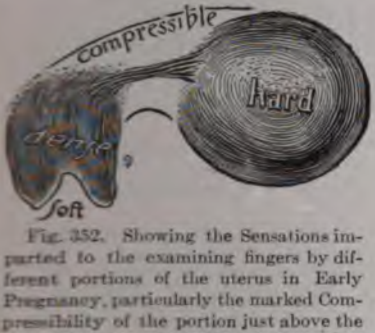


Fig. 352. Showing the Sensations imparted to the examining fingers by different portions of the uterus in Early Pregnancy, particularly the marked Compressibility of the portion just above the internal os (Hegar's Sign). (Dickinson—*American Text-book of Obstetrics.*)

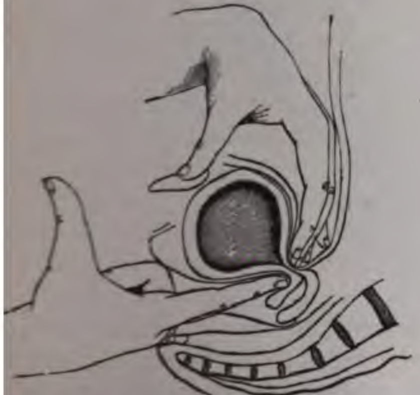


Fig. 353. Palpating for Hegar's Sign, with he uterus forward in the usual position. Edgar—*Practice of Obstetrics.*)

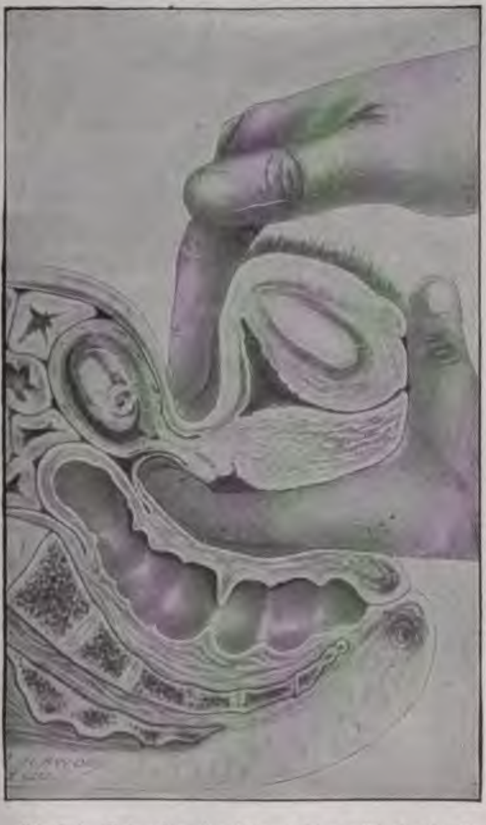


Fig. 354. Palpating for Hegar's Sign, with the fundus uteri pushed backward, the abdominal fingers being in front and the vaginal fingers back of the cervix. (Williams—*Obstetrics.*)

sign, and when well marked is a strong indication of early pregnancy. Fig. 351 shows the section of a uterus in early pregnancy. Fig. 352 explains the sensation imparted to the examining finger. The examination may be made in the usual way, with the abdominal fingers back of the uterus (Fig. 353), or the abdominal fingers may be pressed in front of the fundus uteri, which is displaced somewhat backward, while the vaginal fingers are placed behind the uterus (Fig. 354).

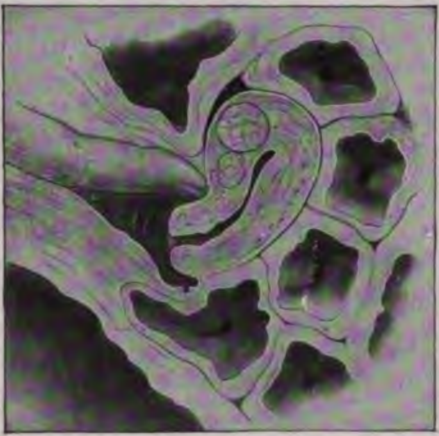


Fig. 355. Hard Nodules in the Corpus Uteri, due to small Fibromyomata. (Montgomery—*Practical Gynecology*.)

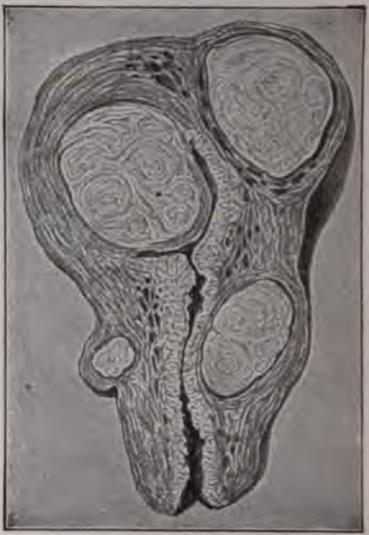


Fig. 356. Larger Fibromyomata, in various situations in the uterine wall. (Schaeffer—*Hand-Atlas of Gynecology*.)

Slight enlargement of the uterus may be due also to tubal pregnancy or to chronic inflammation or to one or more fibroid tumors (Figs. 355, 356, 357, 358) or to carcinoma of the corpus uteri (Fig. 359) or to sarcoma (Fig. 360) or to lipoma (Fig. 361) or to pyometra (Fig. 382) or to tuberculosis of the uterus (Fig. 362).

Marked Enlargement of the Uterus may be due to normal pregnancy (Figs. 363, 364, 365.) Figs. 366 and 367 show the height of the fundus at the various weeks of a normal pregnancy. Bear in mind that the pregnant uterus is not always regular in shape, but is occasionally quite irregular (Figs. 368, 369, 370). Enlargement may be due also to a pregnancy somewhat abnormal, for example, presenting backward displacement or hydramnios or hydatidiform mole or hematom-mole. Again, marked enlargement of the uterus may be caused by interstitial pregnancy (Fig. 371) or by pregnancy in a septate uterus (Fig. 372).

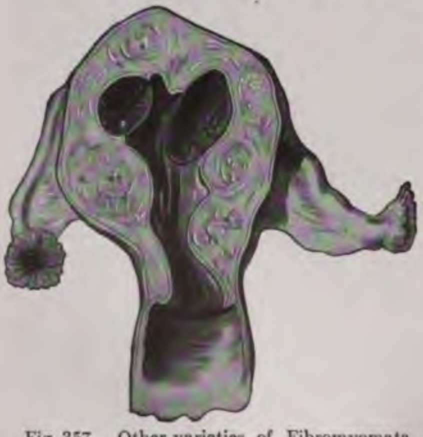


Fig. 357. Other varieties of Fibromyomata, giving rise to a diffuse and more uniform enlargement of the uterus. (Montgomery—*Practical Gynecology*.)

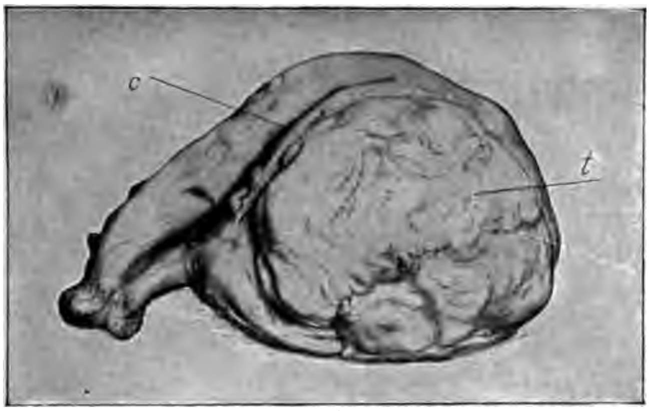


Fig. 358. A Single Fibroid, in the posterior wall of the uterus. (Byford—*Manual of Gynecology.*)

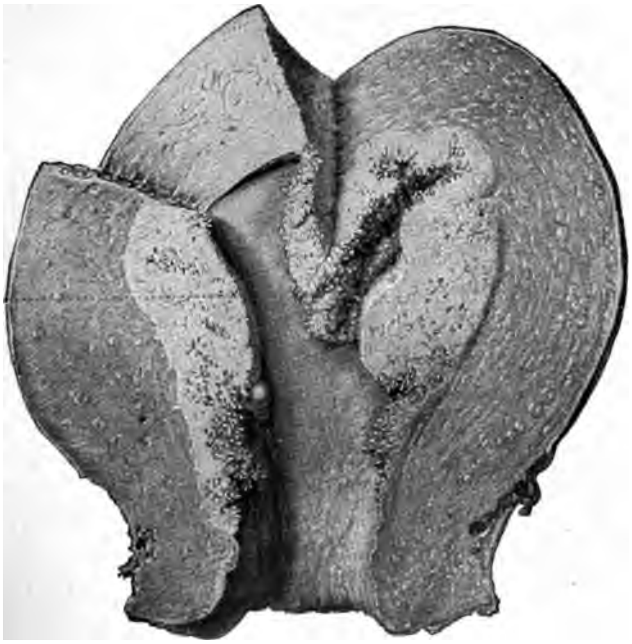


Fig. 359. Slight Enlargement of the Corpus Uteri caused by Carcinoma. (Cullen—*Cancer of the Uterus.*)

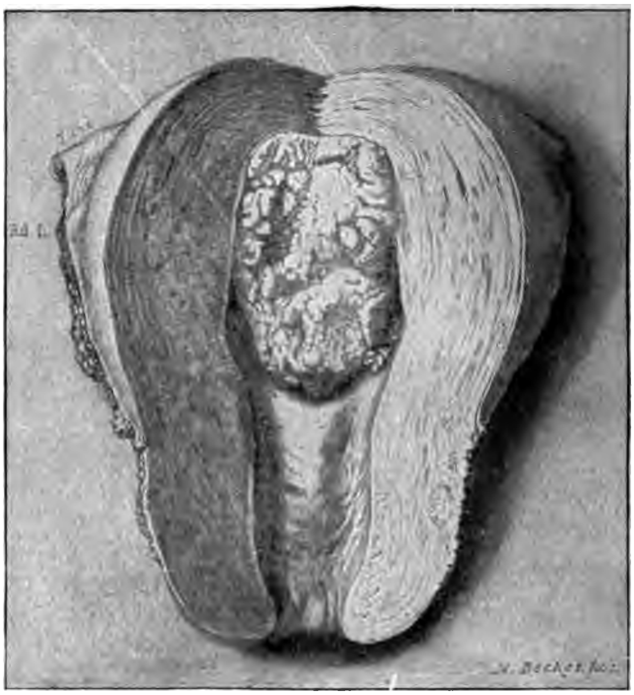


Fig. 360. Slight Enlargement of the Uterus caused by **Sacoma.** (Cullen—*Cancer of the Uterus.*)

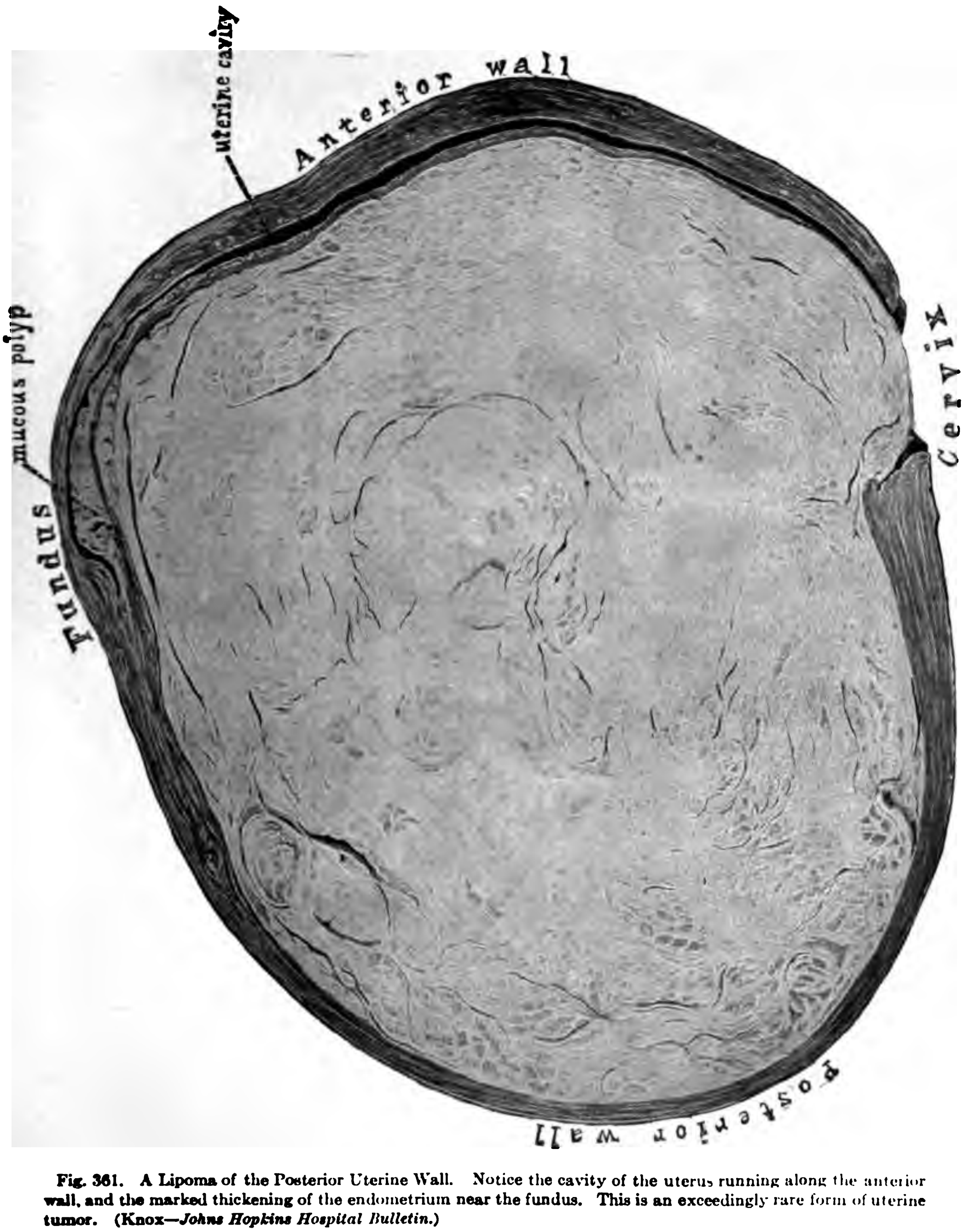


Fig. 361. **A Lipoma of the Posterior Uterine Wall.** Notice the cavity of the uterus running along the anterior wall, and the marked thickening of the endometrium near the fundus. This is an exceedingly rare form of uterine tumor. (Knox—*Johns Hopkins Hospital Bulletin.*)

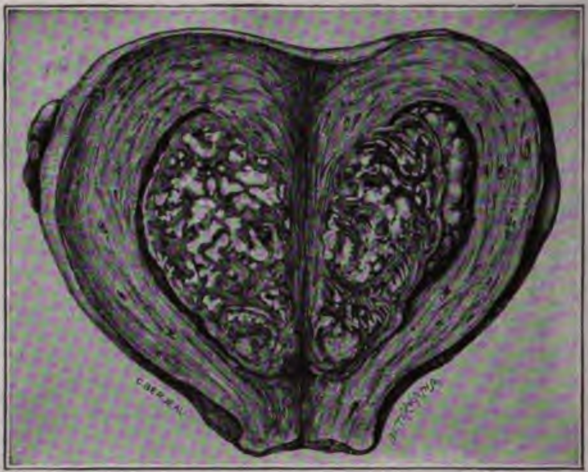


Fig. 362. Tuberculosis of the Uterus. This specimen was removed by supravaginal hysterectomy, the lower portion of the cervix being left. (J. Bland-Sutton—*Essays on Hysterectomy.*)

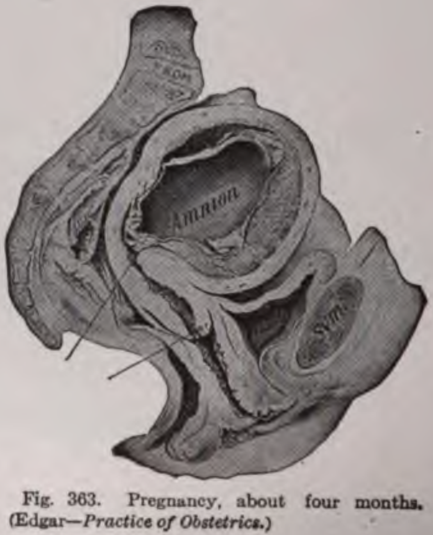


Fig. 363. Pregnancy, about four months. (Edgar—*Practice of Obstetrics.*)

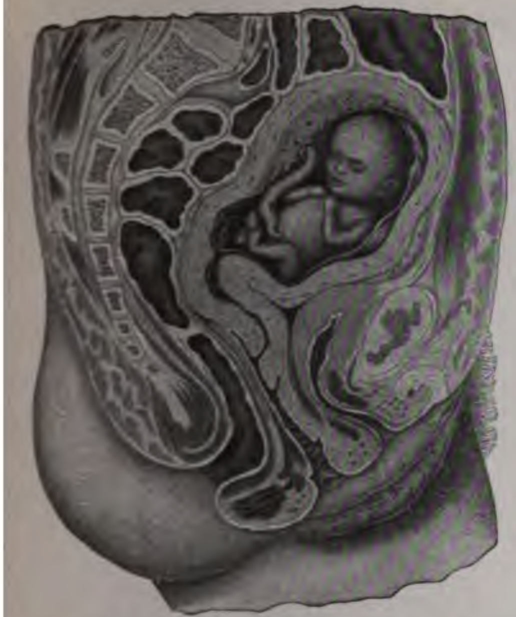


Fig. 364. Pregnancy, about five months. (Edgar—*Practice of Obstetrics.*)

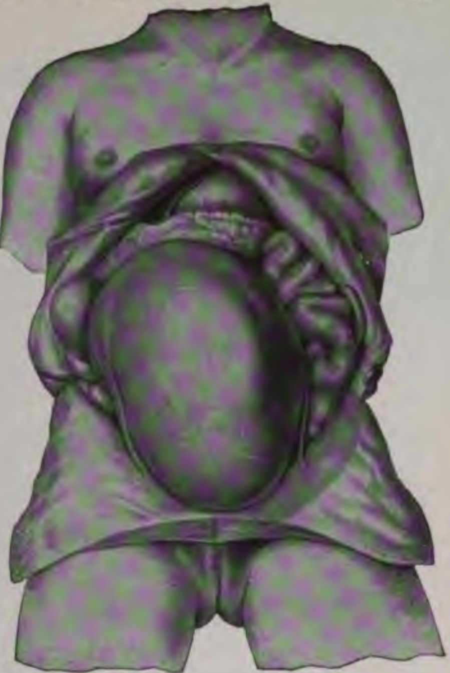


Fig. 365. Pregnancy at Full Term. (Edgar—*Practice of Obstetrics.*)

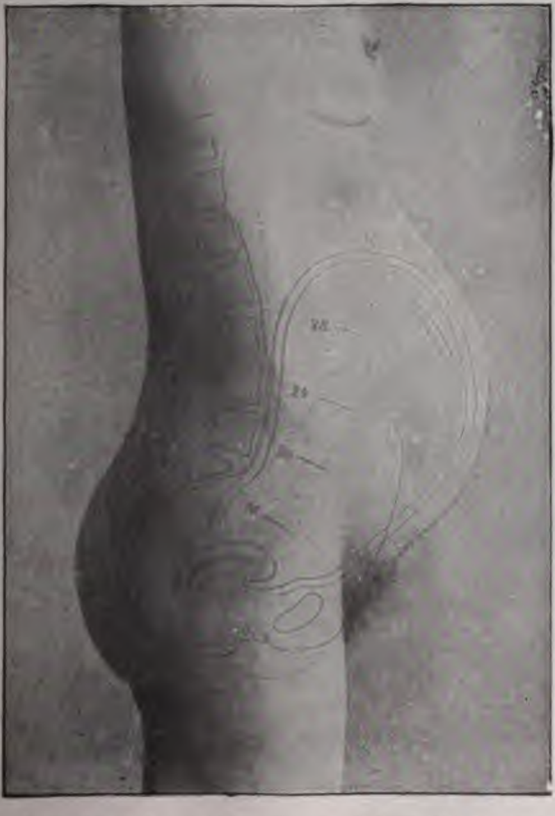


Fig. 366. The Pregnant Uterus contrasted with the non-pregnant uterus, showing the enormous increase in size. The height of the fundus at various weeks of pregnancy is indicated by the numbers. (Dickinson—*American Text-book of Obstetrics.*)

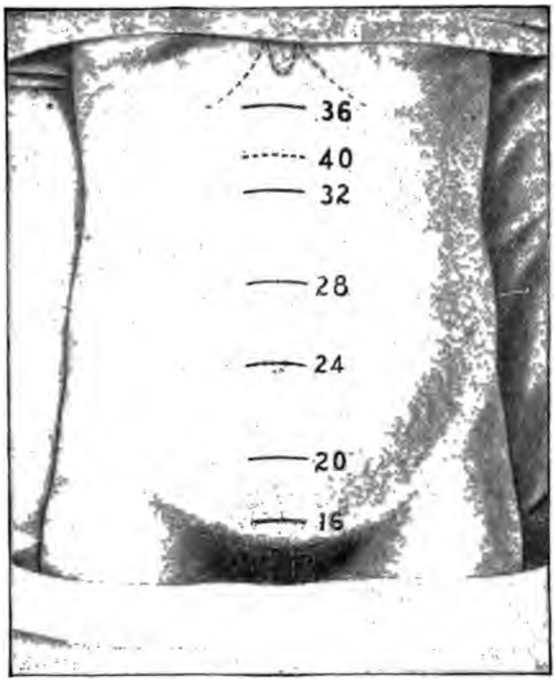


Fig. 367. The Height of the Fundus Uteri at various weeks of Pregnancy. (Williams—*Obstetrics.*)

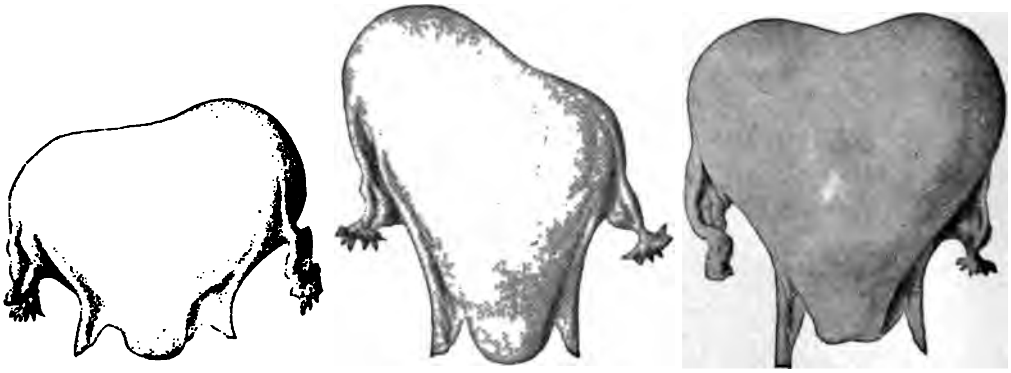


Fig. 368. Fig. 369. Fig. 370.

Figs. 368 and 369 and 370. Irregular Shapes that Pregnant Uteri may present, and which may lead to mistakes in diagnosis. (Edgar—*Practice of Obstetrics.*)

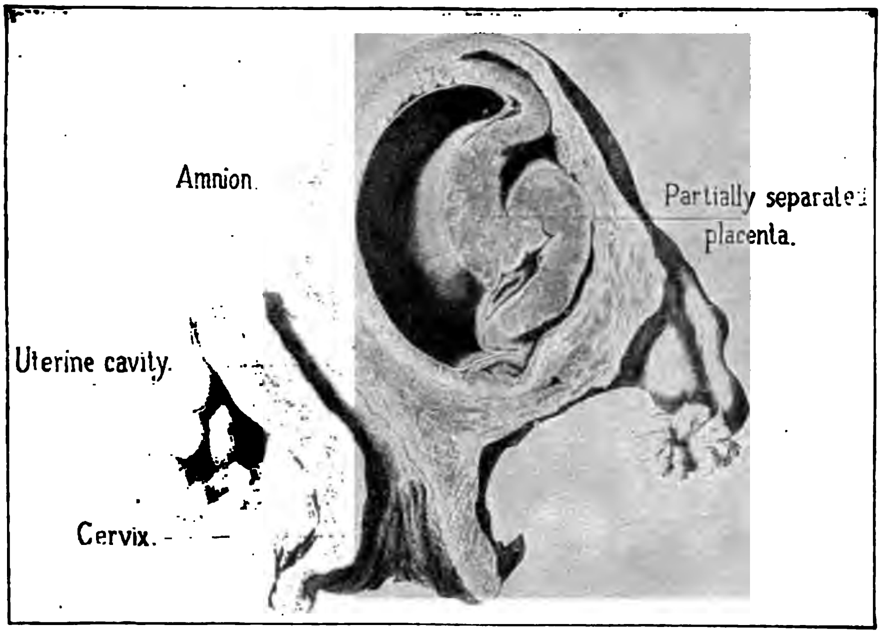


Fig. 371. Interstitial Pregnancy. (Williams, after Bumm—*Obstetrics*.)

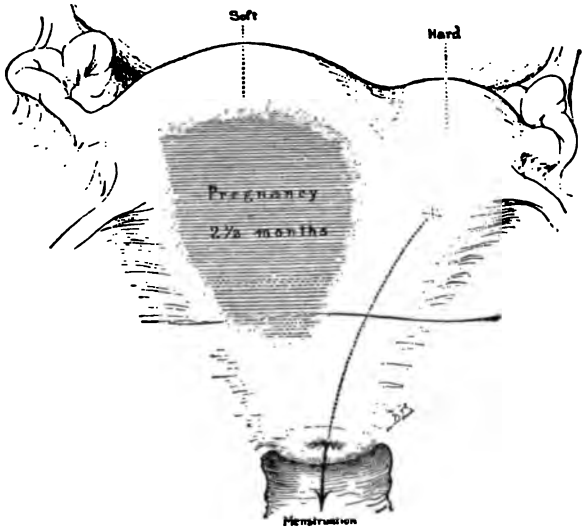


Fig. 372. Pregnancy in the Right Half of a Septate Uterus. (Kelly —*Operative Gynecology*.)

Aside from pregnancy, the usual causes of marked enlargement of the corp uteri are fibromyomata (Figs. 373, 374, 375, 376, 377) and malignant disease (Fi 378).

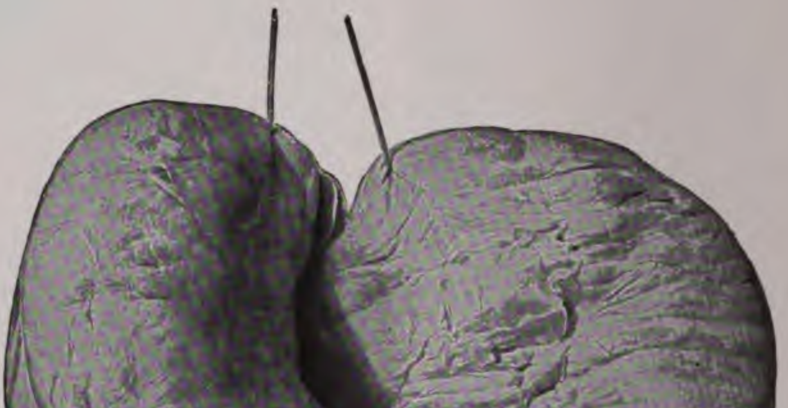


Fig. 373. Uterus Enlarged by a large soft single Fibroid. (Bishop—*Uterine Fibromyomata.*)

In some cases there is an association of fibroid and pregnancy (Figs. 379, 380) o: malignant disease and pregnancy (Fig. 421).

In rare instances the uterus has become enlarged from menstrual

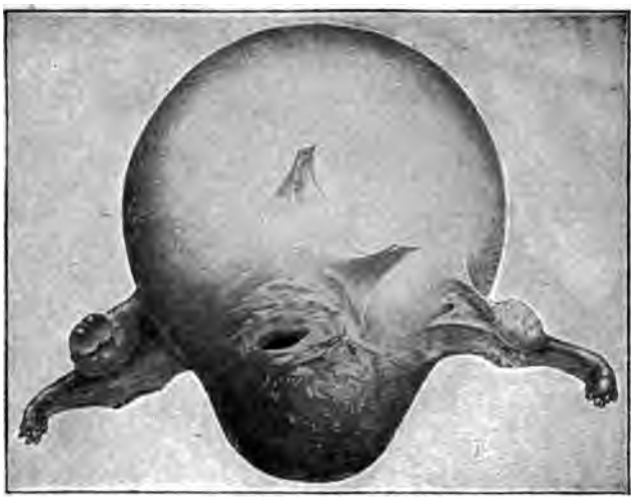


Fig. 374. Uterus Symmetically Enlarged from Fibroids. This might be mistaken for a pregnant uterus, on account of the close resemblance in shape. (Kelly—*Operative Gynecology.*)

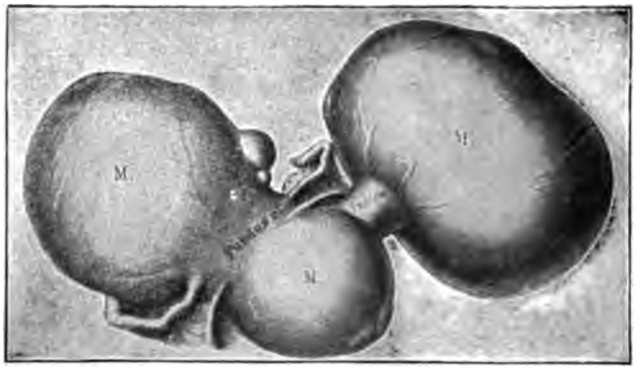


Fig. 375. Subperitoneal Fibroids, showing the irregularity and distortion often present. (Kelly—*Operative Gynecology.*)

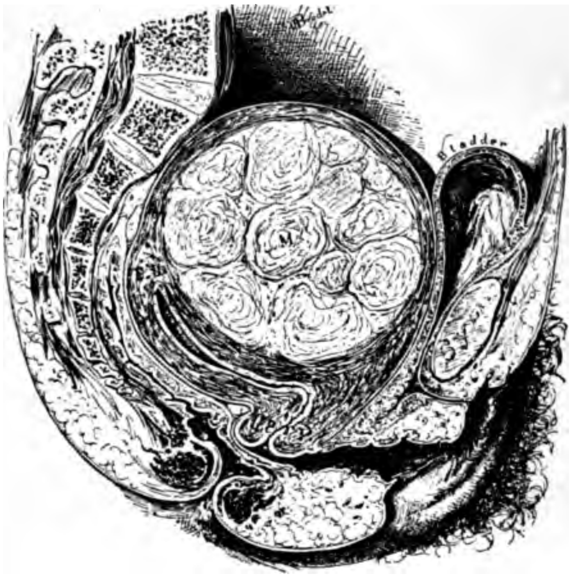


Fig. 376. Single Large Fibroid in anterior uterine wall, choking the pelvis. (Kelly—*Operative Gynecology.*)

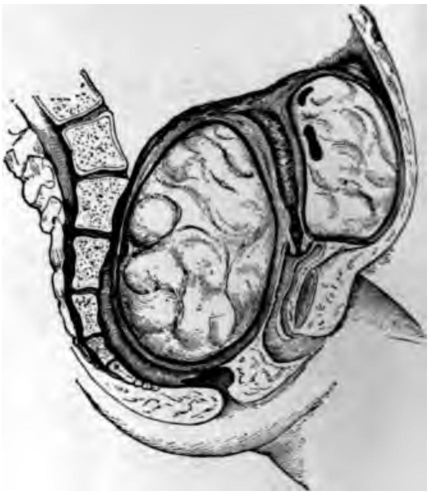


Fig. 377. Large Fibroids, filling the pelvis and lower abdomen. (A. Martin—***Atlas of Gynecology.***)

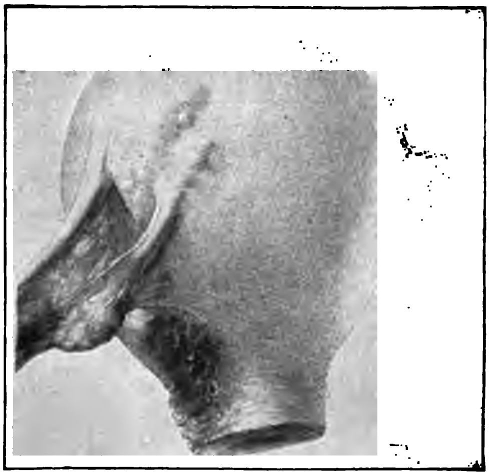


Fig. 378. Uterus Enlarged from Carcinoma. The interior of the uterus is occupied by the growth and it has extended through, forming some nodules on the outer surface. (Kelly—*Operative Gynecology.*)

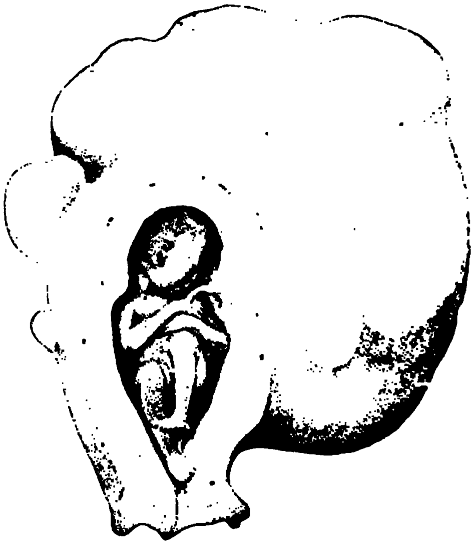


Fig. 379. Fibroid Tumor and Pregnancy, the tumor forming the most of the mass. (Dudley—*Practice of Gynecology.*)

because of atresia of the cervix (hematometra, Fig. 381) or from a collection of pus (pyometra) or of pus and gas (pyophysometra, Fig. 382).

Softening of the Corpus Uteri is caused by the various forms of intra-uterine pregnancy. In most cases of early pregnancy the characteristic compressibility of a portion of the uterus (Hegar's sign) may be made out, and when well marked is of aen assistance in differential diagnosis. Softening of the corpus uteri may be caused also by extra-uterine pregnancy and likewise by a recent pregnancy (i. e., for a few weeks following labor or miscarriage). It is caused also by edema of the uterine wall, from adjacent inflammation or from a tumor interfering with the circulation or from marked displacement.

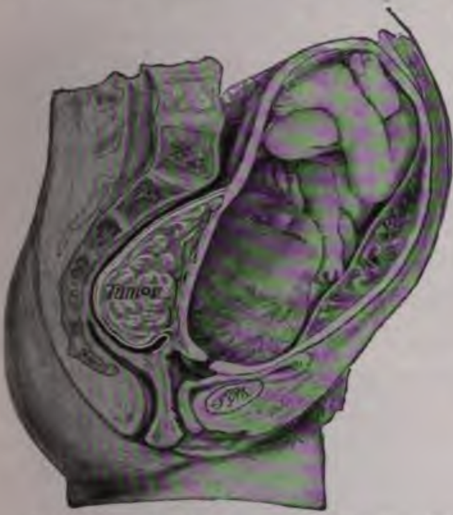


Fig. 380. Fibroid Tumor and Pregnancy, the pregnancy forming the larger part of the mass. (Norris, after Simpson—*American Text-book of Obstetrics.*)

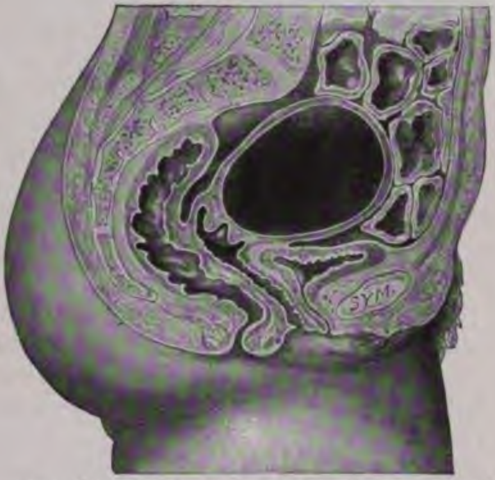


Fig. 381. Uterus distended with Menstrual Blood (Hematometra), due to atresia of the cervix. (Montgomery—*Practical Gynecology.*)

Hard Nodules felt in the Corpus Uteri may be due to parts of the child in pregnancy or to fibromyomata or to a malignant tumor. In rare cases an atheromatous or sclerotic process may cause hardening of areas appreciable to the finger. Also, a mass of exudate or some adherent structure may cause a hard mass tha [illegible] n bimanual examination, rus.

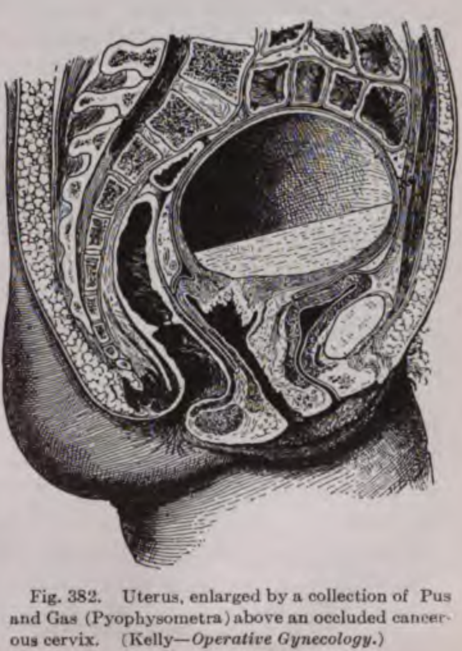


Fig. 382. Uterus, enlarged by a collection of Pus and Gas (Pyophysometra) above an occluded cancerous cervix. (Kelly—*Operative Gynecology.*)

Marked Tenderness of the Uterus may be caused by inflammation of the uterus, by inflammation around the uterus, by hemorrhage around the uterus, by pelvic neuralgia or by functional hyperesthesia (hysteria, neurasthenia).

Fixation of the Uterus may be due to an inflammatory mass, to a hemorrhagic mass, to old adhesions, to a new growth or to scar tissue from vaginal laceration.

Abnormal Mobility of the Uterus is due to overstretching of the supports around it and of the pelvic floor below it.

MASS OR INDURATION

IN PELVIS OR LOWER ABDOMEN, FELT ON BIMANUAL EXAMINATION.

MASS LOW in Pelvis, and to RIGHT of Cervix.

A. Mass or Induration FIRM (No Fluid Felt).

1. Body of the Uterus Displaced to the Right. The mass is directly continuous with the cervix and is about the size and shape of the body of the uterus. The uterus can not be felt elsewhere. If not adherent or very tender, it may be pushed back to the normal position of the corpus uteri. The uterus may lie somewhat to one side, though freely movable, or it may be drawn to one side by adhesions, or it may be pushed over by a tumor or an inflammatory mass or a blood mass.

The displaced uterus may be of a normal size or it may be enlarged. If enlarged, it may be of regular shape or distorted. It may be of normal consistency or softened or presenting hard nodules. If there is inflammation in the uterus or around it, it may present decided tenderness. Whether it is movable or fixed depends on the cause of the displacement. If there is attachment by adhesions to the pelvic wall or to an inflammatory mass or to a tumor, determine whether it is at the lower or upper part of the uterus.

2. Salpingitis with Exudate, extending to the side of the cul-de-sac. The inflamed tube itself is situated higher, but some fibrinous peritoneal exudate has extended down so that it is felt to the right side of the cervix posteriorly.

3. Salpingitis with Prolapse of Thickened Tube. The enlarged and indurated tube may be movable, or it may be bound in its abnormal situation by adhesions.

4. Salpingitis with Secondary Infiltration of the connective tissue about the cervix. This presents practically the same signs low in the pelvis as a primary cellulitis, but in addition there is felt higher, the mass formed by thickened tube and peritoneal exudate.

5. Oophoritis with Prolapse of Ovary. The ovary is usually enlarged and cystic, but none of the cysts are yet large enough to give distinct fluctuation. Ordinarily, the ovary feels much softer on palpation than either an infiltrated tube or a mass of exudate. This softness may be so marked as to lead to the erroneous idea that fluctuation (a well marked cyst) is present, while in fact the ovarian tissue may be practically normal. The chronically inflamed ovary is occasionally as firm as other tissue which is the seat of inflammatory infiltration. This is the case particularly in the cirrhotic ovary, which is also usually smaller than the normal ovary.

The fact that the mass, felt to the right of the cervix posteriorly, is the ovary, is determined by noticing its position, size, shape, consistency, tenderness, mobility and point of attachment. The ovary is usually decidedly tender, even when normal, and pressure upon it produces a peculiar sickening pain.

One of the characteristics of the prolapsed ovary, when not adherent, is that it is freely movable. It slips away from the examining finger and may be pushed up out of the lower part of the pelvis. Following the mass up and making deep bimanual palpation, its point of attachment is found to be in the tubo-ovarian region. If there has been any peritoneal exudate, the ovary is likely to be fixed in its abnormal position by adhesions.

6. Small Abscess from any of the above conditions, near the posterior lateral part of the cervix and with such a thickened wall that no fluctuation is obtained. There is a point of marked tenderness, with fixation of the tissues in the vicinity. If of recent origin there will be some fever, but in an old abscess the temperature may be practically normal. The history of the trouble and the findings elsewhere in the pelvis, will indicate the character of the primary lesion.

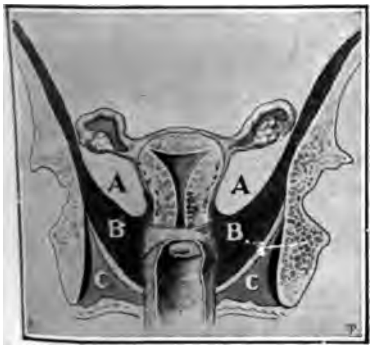


Fig 383. **The Three Spaces** or Areas in the Pelvis. **A. Peritoneal** Cavity. B. Subperitoneal connective tissue area or Parametrial Space. C. Ischio-rectal Space. The white line between B and C represents the levator ani muscle. (Dudley—*Practice of Gynecology*.)

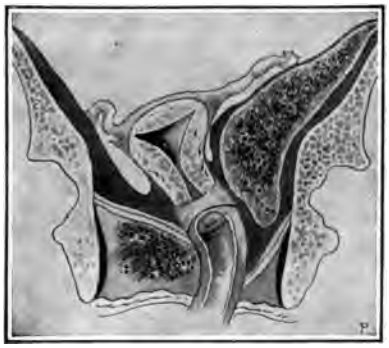


Fig. 384. On the right is a large inflammatory mass in the Parametrial Space. This is what is meant ordinarily by the term Pelvic Cellulitis.

On the left is a small inflammatory mass in the Ischio-rectal Space. From inflammatory trouble in this region comes the well-known Ischio-rectal Abscess. (Dudley—*Practice of Gynecology*.)

7. Adhesions at the side of the cervix from any of the above affections. In the absence of pus or active inflammation, there is usually not much tenderness. The principal signs are induration, without a definitely-outlined mass, and fixation.

8. Cellulitis. This may be acute or subacute. The induration is situated very low and blends with the cervix. It may be a small mass or may fill all that side of the pelvis, extending out to the pelvic wall. As a rule its shape corresponds approximately with the connective areas (Fig. 383). If the inflammation is in the parametrium (above the levator ani), it is immediately about the cervix (Fig. 384). If it is below the levator ani, in the ischiorectal space, the induration will be lower, along the vaginal wall and rectum, and there will be induration near the anus. In pelvic cellulitis, except in the acute cases, the induration feels exceptionally hard, possibly because there is but little intervening soft tissue between the examining finger and the infiltration. The hardness is so marked in some cases as to give the impression of a cartilaginous growth from the pelvic wall. The uterine attachment of the mass is low, principally about the cervix. The outer extremity extends to the pelvic wall, where it is intimately attached over a broad surface (Fig. 384).

9. Small Abscess from Cellulitis, with wall so thick that no fluctuation is obtained. There is a point of marked tenderness, with some fever, and a mass or induration presenting the characteristics of cellulitis.

10. Scar Tissue from former Cellulitis. As explained elsewhere, uncomplicated cellulitis, like other forms of lymphangitis, runs its course and ends in resolution or abscess formation with discharge of the pus. In either case the accompanying inflammatory infiltration eventuates in the formation of new connective tissue which contracts like other scar tissue, causing persistent induration and fixation of tissues in the affected area. There is not much tenderness from the scar tissue itself, but the resulting compression or constriction of nerves and interference with the circulation by distortion, may exceptionally cause persistent tenderness and pain.

11. Scar Tissue from Laceration in Labor. Not infrequently tears of the cervix are so extensive that they involve the vaginal wall and the parametrium, giving scars that may be felt beside the cervix. The induration may be linear or widespread. The fixation of the cervix may be slight or marked, depending on the amount and situation of the scar tissue. Usually there is not much tenderness.

12. Malignant Infiltration of the parametrium, extending from the cervix uteri or the bladder or the rectum. The induration is firm and is situated immediately beneath the vaginal wall and usually follows approximately the outline of the connective area. Ordinarily there is not much tenderness, unless there is complicating inflammation. The amount of fixation of the cervix depends on the extent of the infiltration.

13. Fibroid of Uterus, growing into right broad ligament. The mass projects out from the side of the uterus, has a rounded well-defined outer border and is firm and not tender. The mass is fixed by a broad attachment to the side of the uterus but the uterus and mass together are movable in the pelvis, unless the mass is so large that it extends to the pelvic wall or there is complicating inflammatory fixation.

14. Affection of Right Ureter. A mass about the ureter may be caused by inflammation in and around the ureter. The inflammation may be due to a stone lodged in the ureter or to tubercular ureteritis or to an ascending pus infection. The mass is situated in the course of the ureter, is small at first and may give the impression of a small nodule like an enlarged gland in the tissues. It is firm, very tender, fixed, but not intimately attached to any of the adjacent organs until extensive infiltration has formed. Fig. 385 shows a mass from the right ureter. A mass from the ureter is accompanied by bladder irritability and urinary abnormalities.

15. Solid Tumor of Ovary or Tube, bound down by adhesions and forced to grow towards the cervix. The mass would necessarily become of considerable size before reaching that region. It is approximately spherical, though of somewhat irregular outline. It is firm and usually somewhat tender because of the accompanying inflammation, but not as tender as an inflammatory mass of the same size would be. It is fixed in the pelvis and attached to all surrounding structures. The uterus is usually pushed far to the opposite side, but the history does not show the severe disturbance that would necessarily accompany a purely inflammatory mass of like size.

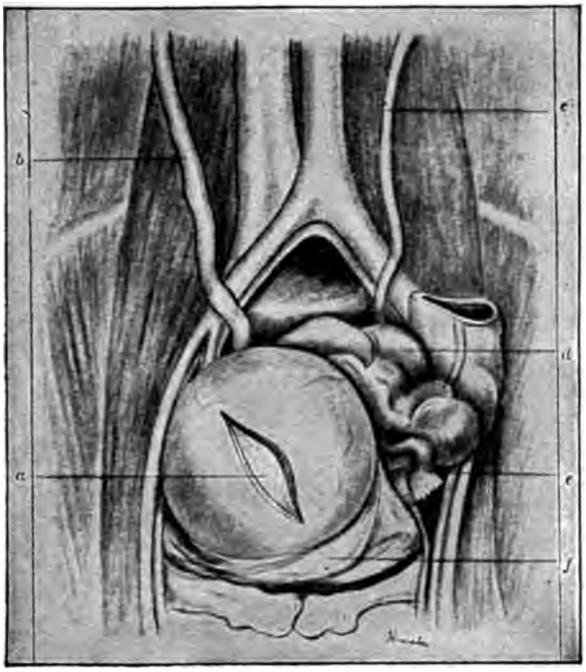


Fig. 385. Mass in Right Ureter. It is a Calculus of enormous size, situated in the ureter and extending into the bladder-wall; a, calculus; b, upper part of right ureter (thickened); c, left ureter; d, sigmoid; e, left Fallopian tube; f, bladder pushed to one side. (Bovée—*Practice of Gynecology.*)

B. Mass Contains Fluid (Fluctuation May be Obtained).

1. Pelvic Abscess (Fig. 386) from salpingitis, with secondary involvement of connective tissue, or from primary cellulitis, or from suppuration in a fibroid tumor or in a cyst or in a hematoma in this situation. The mass usually fills in all the lower part of that side of the pelvis, and is surrounded by infiltration which shades off gradually into the surrounding tissues. The area of fluctuation is surrounded by induration. There is marked tenderness at the point of fluctuation, which diminishes usually as the periphery of the mass is reached. There is fixation of all the involved tissues and of the adjacent organs, including the uterus. The history and the findings elsewhere in the pelvis, indicate the seat of the primary inflammation.

2. Pelvic Hematoma (Fig. 387). This usually comes from a tubal pregnancy, which has ruptured between the layers of the broad ligament. The induration runs down close around the cervix, and may be small or may fill all that side of the pelvis extending up to the top of the broad ligament. It has a general rounded outline, much more so generally than an inflammatory infiltration in the connective tissue, though it is limited anteriorly and posteriorly by the separated peritoneal layers of the broad ligament.

It is largely fluid and there is distinct fluctuation over a considerable area, as in a cyst. Also, there is not so much surrounding induration as in an abscess, though usually considerably more than in a cyst. The tenderness is not nearly so marked as in a collection of blood in the peritoneal cavity. Of course the tenderness varies somewhat, being more marked when the hemorrhage is recent and extensive, in which case it may be very marked. Ordinarily the tenderness from a hematoma is not nearly so marked as tenderness from an abscess. There is fixation of the mass in the situation in which it is found, and, if extensive, it fixes the uterus to the pelvic wall. The history and the findings elsewhere will show the cause of the trouble.

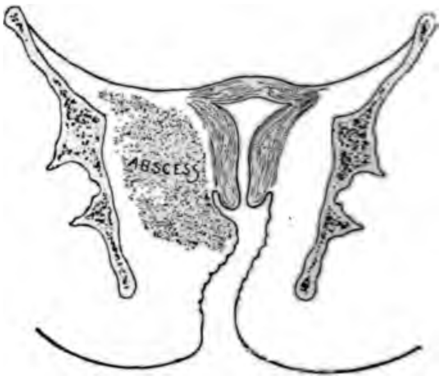


Fig. 386. Mass beside Uterus, formed by Abscess in broad ligament. (Montgomery—*Practical Gynecology.*)

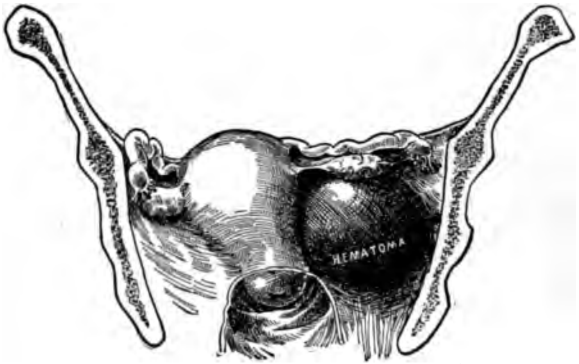


Fig. 387. Hematoma of Right Broad Ligament. (Montgomery—*Practical Gynecology.*)

3. Hydrosalpinx coming low in the pelvis. The cystic mass runs up into the tubal region. It is somewhat elongated and sausage-shaped and extends from the upper angle of the uterus to the pelvic wall. It fluctuates freely and gives the impression of a thin-walled cyst. Frequently some induration from exudate or adhesions, may be felt. It is not tender ordinarily. It is somewhat movable, though not as much so as a small pediculated ovarian tumor. It is attached to the uterus and to the pelvic wall and along the upper part of the broad ligament.

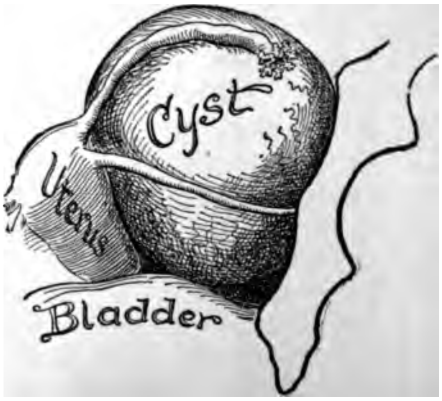


Fig. 388. A Parovarian Cyst, forming a large Mass and displacing the uterus. (Ashton—*Practice of Gynecology.*)

4. Parovarian Cyst (Fig. 388). It is situated near the center of the broad ligament and, if as large as an orange, it begins to come down about the cervix just beneath the vaginal wall. It is approximately spherical, though somewhat irregular in shape. It fluctuates freely throughout and the fluid seems very close to the examining fingers. There is no tenderness, unless complicated by inflammation or neuritis or other painful affection.

It is fixed, as a rule, but not firmly. The peritoneal layers of the broad ligament stretch sufficiently to permit considerable movement in some cases, especially later, when the cyst has gotten so large that it rises out of the pelvis. The uterus is displaced to the opposite side, and the cyst is attached to it and to the pelvic wall, but not intimately as a rule. If inflammation takes place about the cyst then there is marked fixation and attachment to all adjacent organs, and the cyst as it grows may elongate the body of the uterus.

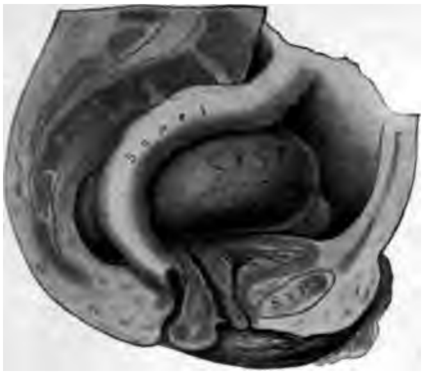


Fig. 389. An Ovarian Cyst growing in beside the uterus. (Montgomery—*Practical Gynecology.*)

5. Ovarian Cyst growing toward the cervix (Fig. 389). An ovarian cyst which has been fixed in the pelvis by inflammation may grow in this direction. It presents the same characteristics as a parovarian cyst complicated by inflammation, except that fluctuation is not so uniform throughout the mass. There may be firm portions representing thick septa or small areolar cysts.

6. Cystic Fibroid. This presents the ordinary characteristics of a fibroid, except that there is a point of fluctuation and there may be some tenderness.

7. Uterus containing fluid and displaced to one side. This fluid in the uterus may be due to pregnancy, normal or abnormal, or to a cystic fibroid or topus in the uterus or to blood in the uterus.

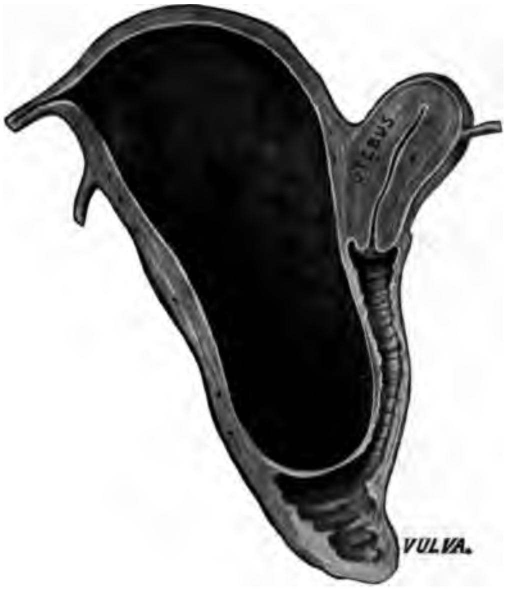


Fig. 390. Hematometra in a Rudimentary Horn of the Uterus. (Montgomery—*Practical Gynecology.*)

8. Rudimentary Horn of Uterus, containing blood (Fig. 390) or other fluid. There may be pregnancy in such a horn (Fig. 408).

9. Vaginal Cyst. Vaginal cysts may come from remnants of the Wolffan duct or from aberrant gland structures in the vaginal wall. They protrude into the vagina more or less, are small and rounded, have fluctuation throughout with a thin wall and are not tender unless complicated. They are fixed in the lower part of the pelvis and lie just beneath the vaginal wall, to which they are closely attached.

10. Ureter Greatly Dilated. The fluid in the dilated ureter may be urine (hydro-ureter) or pus (pyo-ureter). The upper part of the ureter and the kidney is usually dilated also (hydronephrosis, pyonephrosis). A fluctuating swelling is found in the region of the ureter, accompanied by symptoms of bladder irritation and urinary evidences of disease. The retained urine may be discharged at times through the bladder. The swelling then largely disappears, to reappear when the obstruction again occurs and the sac refills. A careful investigation as to the amount and character of the urine discharged with the variation in the size of the mass, is an important step in the diagnosis of such a mass.

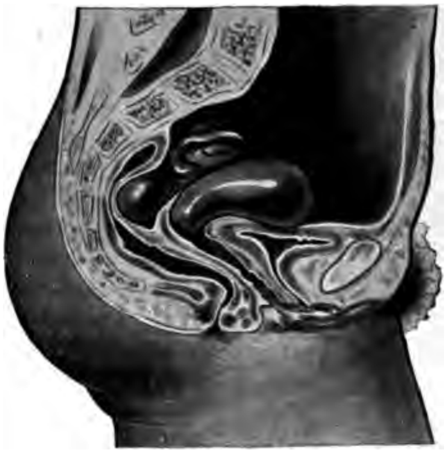


Fig. 391. Thickened Tube and Ovary prolapsed into the cul-de-sac behind the uterus. (Montgomery —*Practical Gynecology*.)

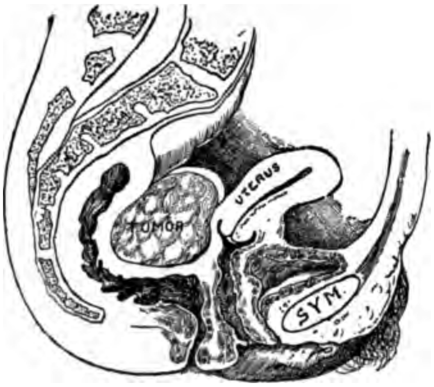


Fig. 392. A Fibroid Tumor, forming a Mass behind the uterus. (Montgomery—*Practical Gynecology*.)

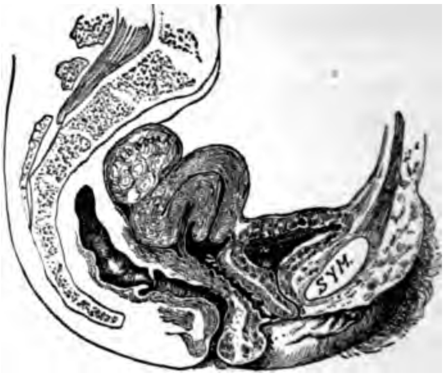


Fig. 393. A Retroflexed Uterus and a Fibroid. forming a Mass behind the cervix. (Montgomery—*Practical Gynecology*.)

MASS LOW in Pelvis, and to LEFT of Cervix.

A. Mass or Induration **Firm** (No fluid felt). Same as on right side.
B. Mass contains **Fluid** (Fluctuation obtained). Same as on right side.

MASS LOW and BEHIND Cervix.

A. Mass or Induration Firm.

1. **Body of Uterus Displaced** backward to the 3rd degree (Fig. 71). Any of the various solid conditions of the uterus previously mentioned may be present.
2. **Salpingitis with Exudate** extending into the cul-de-sac.
3. **Salpingitis with Prolapse** of the thickened tube into the cul-de-sac (Fig. 391.) The prolapsed tube may be movable or adherent.
4. **Salpingitis with Secondary Infiltration** of the connective tissue back of the uterus.
5. **Oophoritis with Prolapse** of the ovary. The prolapsed ovary may be movable or adherent. The characteristic palpation signs of a prolapsed ovary have already been given.
6. **Small Abscess** behind the cervix, from any of the above conditions and with such a thick wall that no fluctuation is obtained.
7. **Adhesions** behind the cervix, from any of the above affections.
8. **Cellulitis.** For the characteristic palpation signs of cellulitis, see under "mass to right of cervix."
9. **Small Abscess from Cellulitis,** with wall so thick that no fluctuation is obtained.
10. **Scar Tissue from Former Cellulitis.** This is not nearly so frequent in this region as peritoneal adhesions.
11. **Scar Tissue from Laceration in Labor.** This is found occasionally, though it is rare in this situation. Most of the deep lacerations extend laterally.
12. **Malignant Infiltration** from cancer of cervix uteri or from cancer of the rectum or from cancer of the bladder.
13. **Fibroid of the Uterus** growing posteriorly from the cervix or lower part of the corpus uteri (Figs. 392, 393).
14. **Affection of Ureter** with exudate extending back of the uterus. The differential diagnostic points of a ureteral mass have already been given (page 258).
15. **Solid Tumor of Ovary or Tube,** forced to grow into the cul-de-sac.
16. **Fecal Mass in Rectum.** Along the lower part of the posterior vaginal wall such masses cause no trouble in diagnosis, but in the region of the cul-de-sac they may lead to a mistake. The characteristics of such a fecal mass are that it is situated in the course of the rectum, that it is not particularly tender, that it is of putty-like consistency and may be indented (the dent remaining) and that it may be moved along to another position in the canal. If there is still doubt, direct the patient to take a purgative to give a good bowel movement and the next day an enema to clear out the large bowel, and then return for another examination.

17. Tumor of Rectum. The mass is in the wall of the rectum and there are usually symptoms of rectal irritation, with the passage of blood and mucus.

18. An Abdominal Organ Prolapsed into the cul-de-sac. A wandering kidney or spleen may be found in this situation. It may be movable or fixed. It presents somewhat the characteristics of the organ involved, i. e., it has about the size, shape, consistency and tenderness. If movable it may be pushed back into the normal situation of the organ. An examination in the Trendelenburg posture may aid very materially in this. The knee-chest posture, taken for a few seconds, may cause the organ to return to the abdominal cavity. Careful examination may show the organ absent from its normal position. If it is the kidney, there may or may not be bladder symptoms or urinary abnormalities.

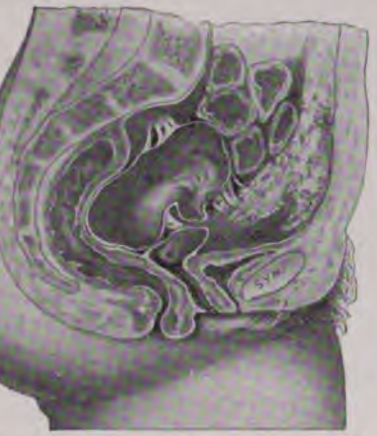


Fig. 394. An Abscess behind the uterus. (Montgomery—*Practical Gynecology*.)

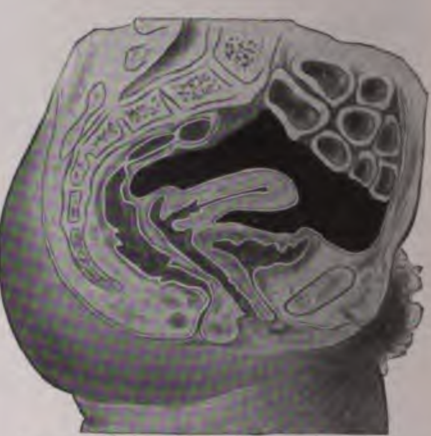


Fig. 395. A Blood Mass filling the pelvis and running down behind the uterus. (Montgomery—*Practical Gynecology*.)

B. Mass, Behind Cervix, Contains Fluid.

1. Pelvic Abscess (Fig. 394) from salpingitis, from oophoritis, from cellulitis, from hematocele or hematoma, from a suppurating solid tumor or from a suppurating cyst.

2. Intra-peritoneal Hemorrhage (Fig. 395). This usually comes from tubal pregnancy, with rupture of the wall of the tube or abortion from the end of the tube into the peritoneal cavity. Blood in the peritoneal cavity presents one of three conditions, as follows:

a. The blood may be free in the cavity. This, like ascites, does not give rise to any distinct mass or induration, hence does not require consideration here. The characteristics of this condition are given in chapter XI.

b. Clots and fibrinous exudate forming a mass about the affected tube and extending from the tube into the cul-de-sac. This forms a mass. If there is a large amount of plastic exudate, the mass is rather firm and with definite outlines. If the mass is made up principally of recent blood clots, it is soft and the outlines indistinct. This condition is found in those cases where there are repeated slight hemorrhages. This is a dangerous state of affairs for, though the bleeding has stopped temporarily, any exertion, or a disturbance of the clots by an examination, may start a severe hemorrhage.

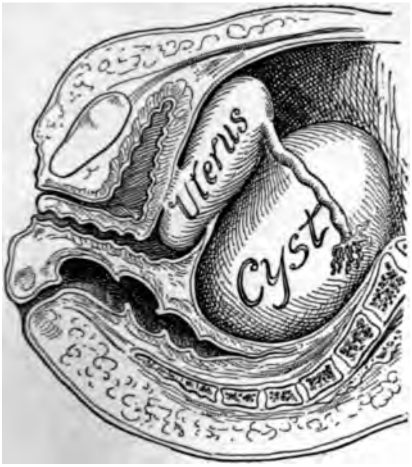


Fig. 396. An Ovarian Cyst lying back of the uterus. (Ashton—*Practice of Gynecology*.)

c. Some blood has run into the cul-de-sac and a firm roof of fibrinous exudate has formed above it, shutting it off completely from the general peritoneal cavity. This condition is called pelvic "hematocele", and represents the least dangerous condition of intra-peritoneal hemorrhage.

The physical signs of intraperitoneal clotted blood and exudate are practically the same as those of inflammatory exudate, with the exception of the temperature. There is usually but little fever after the first forty-eight hours, and in many cases not much at any time. Of course, if suppuration comes on later in the blood mass then the ordinary signs of suppuration appear, including fever. The diagnosis of a blood mass, rather than an inflammatory mass, must rest largely upon the absence fo decided fever in the presence of acute symptoms and upon certain points in the history and progress, indicating a tubal pregnancy. These points are given under tubal pregnancy in chapter XI.

3. Hydrosalphinx low in the cul-de-sac. The prolapsed and distended tube may be movable or adherent.

4. Parovarian Cyst pushing back behind cervix and filling the posterior part of the pelvis.

5. Ovarian Cyst in cul-de-sac (Figs. 396, 397). A small ovarian cyst may easily drop into the cul-de-sac. If it becomes adherent it will remain there, choking the pelvis as it enlarges.

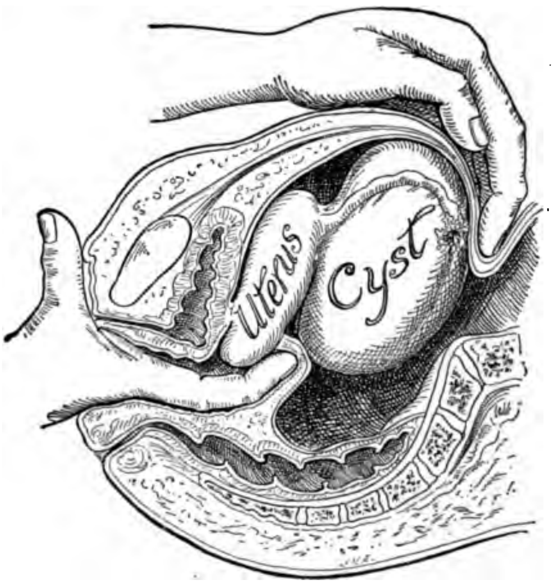


Fig. 397. Showing the Method of Testing the Mobility of such a Mass. (Ashton—*Practice of Gynecology*.)

6. Cystic Fibroid. This presents the characteristics of a fibroid, with fluctuation and some tenderness added.

7. Uterus Containing Fluid and displaced backward. The fluid in the uterus may be due to pregnancy or to a cystic fibroid in the wall or to pus or to blood.

8. Small Cyst of Some Abdominal Structure lying in cul-de-sac. Such a cyst may come from the omentum, from the mesentery or form a prolapsed kidney or spleen.

9. Ureter Greatly Dilated (hydro-ureter or pyo-ureter) and filling in back of the uterus.

MASS LOW and IN FRONT of Cervix.

A. Mass or Induration Firm.

1. Uterus Displaced Forward. There may be any of the solid conditions of the uterus already mentioned.

2. Fibroid Tumor of Uterus (Fig. 398).

3. Malignant Disease of cervix extending forward or of the urethra extending backward or of the vagina, may give induration in front of the cervix.

4. Cellulitis, between uterus and bladder. The characteristics of an induration from cellulitis have already been given (page 258.)

5. Bladder Disease. This may be a tumor (Fig. 399) or tuberculosis (Fig. 400) or chronic inflammation.

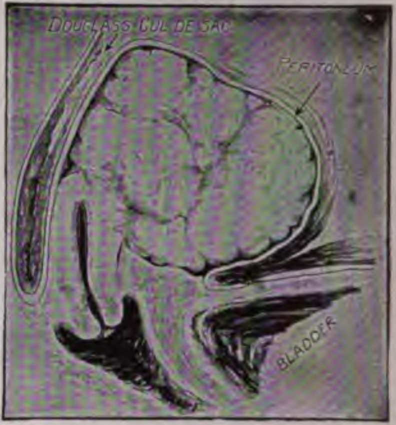


Fig. 398. A Fibroid forming a Mass in front of the uterus. (Thomas and Munde—*Diseases of Women.*)

B. Mass, in Front of Cervix, Contains Fluid.

1. Bladder Distended with Urine (Fig. 344). Whenever, in making a bimanual examination, a cystic mass is felt in front of the uterus, catheterize the patient if necessary to eliminate a full bladder.

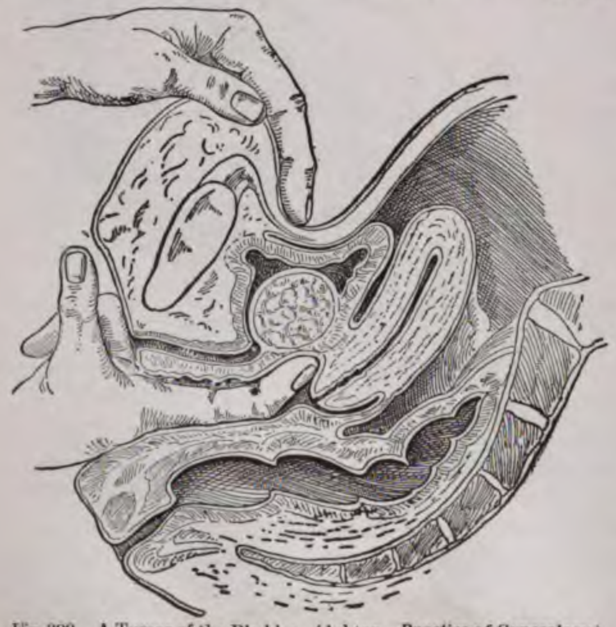


Fig. 399. A Tumor of the Bladder. (Ashton—*Practice of Gynecology.*)

2. Uterus Containing Fluid. This is usually due to pregnancy, though it may rarely be due to pyometra or hematometra.

3. Pelvic Abscess. A pelvic abscess in this situation is usually due to a cellulitis.

4. Pelvic Hematoma. Occasionally a hematoma from tubal pregnancy will dissect in between the uterus and bladder and give a

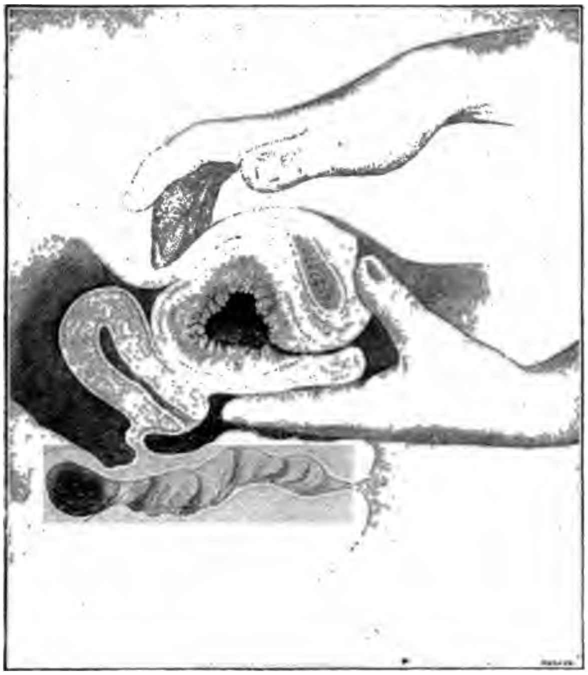


Fig. 400. Tuberculosis of the Bladder, forming a Mass in front of the uterus. (Dudley—*Practice of Gynecology*.)

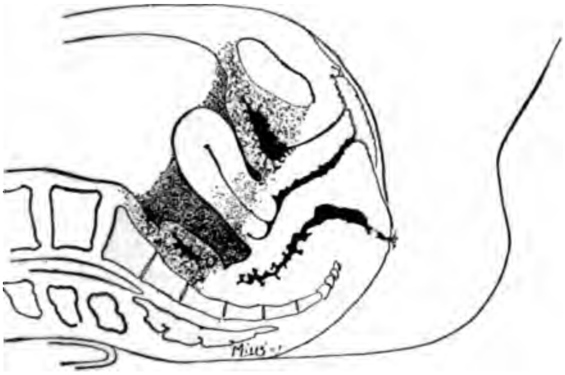


Fig. 401. Inflammatory Exudate filling the pelvis and forming a firm roof above the examining fingers. The resisting "roof" usually follows about the line indicated in Fig. 402.

fluctuating mass in this region, but this is very rare.

5. Vaginal Cyst. This projects into the vagina, and the fluid appears to be just beneath the vaginal wall. Its point of attachment is very low, apparently in the vesico-vaginal septum.

6. Parovarian Cyst. Such a cyst may grow in between the uterus and the bladder.

7. Cystic Fibroid. A fibroid growing from the anterior part of the cervix may displace the bladder upward and give a mass just in front of the cervix.

MASS LOW and FILLING Pelvis.

A. Mass or Induration Firm.

1. Extensive Inflammatory Exudate or infiltration, from salpingitis, oophoritis, peritonitis or cellulitis (Fig. 401). This extensive inflammatory exudate fixes all the organs, as though plaster of Paris had been run in around them and had hardened there. On making the vaginal examination there is found a firm roof above the examining fingers, on approximately the plane indicated in Fig. 402.

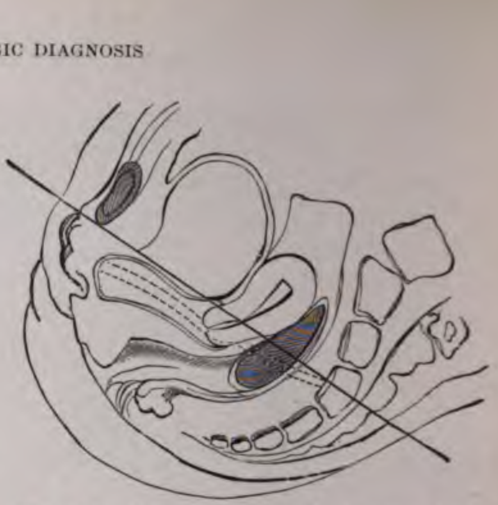


Fig. 402. Indicating the general direction of the lower surface of the "roof of exudate" in most cases. (Thomas and Munde—*Diseases of Women*.)

2. Extensive Bleeding in the pelvis, in the form of hematoma or hematocele or blood clots without limiting roof of exudate.

3. Large Fibroid in lower part of uterus. This may be any one of the various forms of fibromyoma.

4. Malignant Disease of cervix or corpus uteri or of bladder or of rectum. There may be malignant disease and fibroid.

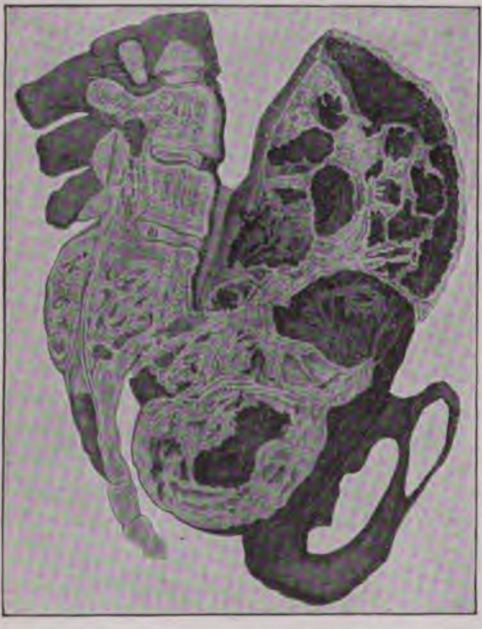


Fig. 403. Pelvis filled with a Bony Tumor from the pelvic wall. (A. Martin—*Atlas of Gynecology*.)

5. Tumor from Pelvic Wall (Fig. 403).

B. Mass, Low and Filling Pelvis, Contains Fluid.

1. Uterus Pregnant. The enlarged and fluctuating uterus may be in normal position or in displacement (Fig. 350). It may be regular in shape or very irregular (Figs. 368, 369, 370).

2. Parovarian Cyst. This may grow low in the pelvis and fill it, displacing the organs in various directions.

3. Ovarian Cyst. An ovarian cyst bound down by adhesions, may fill the pelvis and extend to the lower part of it. There may be some complicating condition, for example, an ovarian cyst and pregnancy (Fig. 404).

4. Pelvic Abscess with extensive exudate or infiltration may fill the pelvis. The point of fluctuation is usually behind the cervix. Most of the mass is firm, and there is the firm inflammatory roof previously mentioned.

5. Collection of Blood in pelvis. This may be present in the form of hematoma or hematocele. In addition to an area of fluctuation, there is usually the firm roof due to accompanying infiltration and exudate.

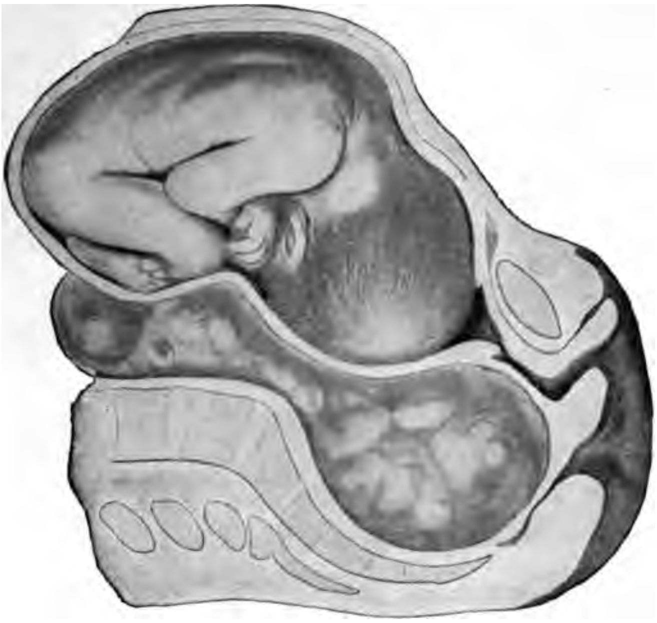


Fig. 404. Pelvis and Lower Abdomen filled with a Mass composed of a Pregnant Uterus and an Ovarian Cyst. (Williams, after Bumm—*Obstetrics.*)

MASS HIGH, in Pelvis or Lower Abdomen, RIGHT Side.

A. Mass or Induration Firm.

1. Uterus Displaced. Any one of the various solid conditions of the uterus previously mentioned may form a mass in the center of the pelvis or to one side.

2. Salpingitis. There may be simply a thickened tube (Fig. 405) or a large mass of exudate.

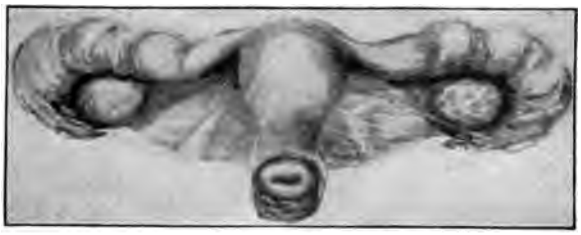


Fig. 405. Salpingitis Nodosa. (Thomas and Munde—*Diseases of Women.*)

3. Pyosalpinx, with small amount of pus and such a thick wall that no fluctuation is obtained. There may be very little peri-tubal exudate or a great deal.

4. Oophoritis, without any cyst large enough to give fluctuation. There may be little or no exudate or there may be a large amount of exudate.

5. Adhesions, from any of the above conditions. The adhesions may be slight or extensive.

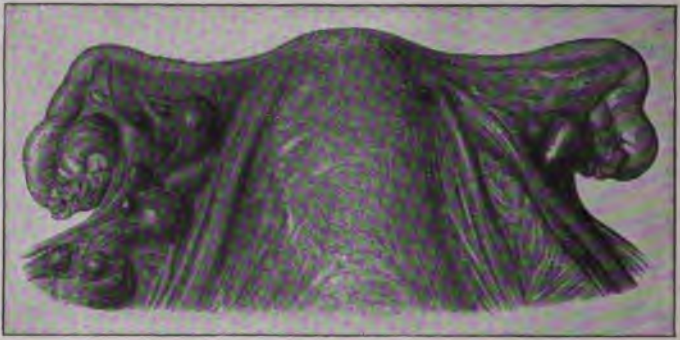


Fig. 406. Thrombosis of Veins of the broad ligament. (Schaeffer—*Hand-Atlas of Gynecology.*)

6. Cellulitis, in upper part of broad ligament, or resulting scar tissue from same.

7. Thrombosis of Veins of Broad Ligament (Fig. 406). This condition, though rare, probably occurs more frequently than is generally supposed.

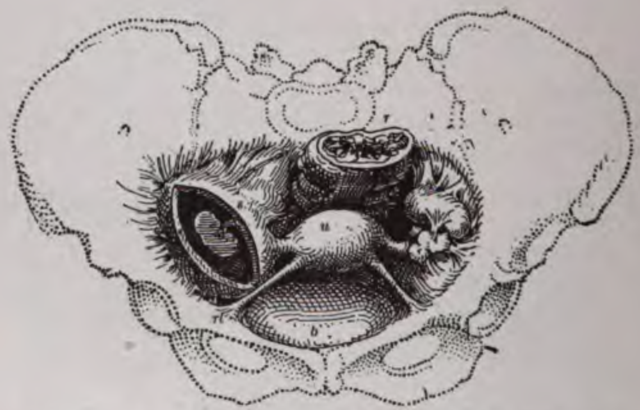


Fig. 407. Tubal Pregnancy in the Right side. (Dickinson—*American Text-book of Obstetrics.*)

8. Solid Tumor of Ovary or Tube. This may be small or large, movable or adherent.

9. Extra-uterine Pregnancy. This may be tubal pregnancy (Fig. 407) or pregnancy in a rudimentary horn of the uterus (Figs. 408, 409). For the special evidences of extra-uterine pregnancy see chapter XI. Tubal pregnancy, with its resulting hemorrhage and plastic exudate and adhesions binding together the various structures and giving a tender mass in the tubo-ovarian region, is most frequently mistaken for an ordinary inflammatory mass.

10. Pelvic Tuberculosis. The mass presents the characteristics of a chronic inflammatory mass, which in fact it is. The fact that the inflammation is tubercular must be determined by other features of the case than the pelvic palpation. For these other diagnostic points, see pelvic tuberculosis in chapter XI.

11. Fibroid Tumor of Uterus. This is subperitoneal and may be pediculated (Fig. 375) or sessile (Fig. 376).

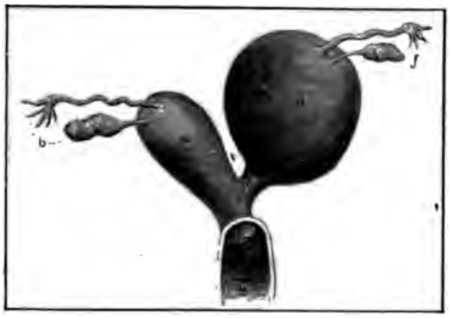


Fig. 408. Pregnancy in the Rudimentary Horn of a malformed uterus. (Jay's Case—*Saunder's Year Book, 1904.*)

12. Appendicitis with Exudate. The mass is situated about the appendix and the history points to bowel trouble, rather than to tubal trouble. In some cases the appendix extends into the tubal region, causing more or less confusion in diagnosis. The various situations which the appendix has been found to occupy in different cases, without change of the position of the caecum, are shown in Fig. 410.

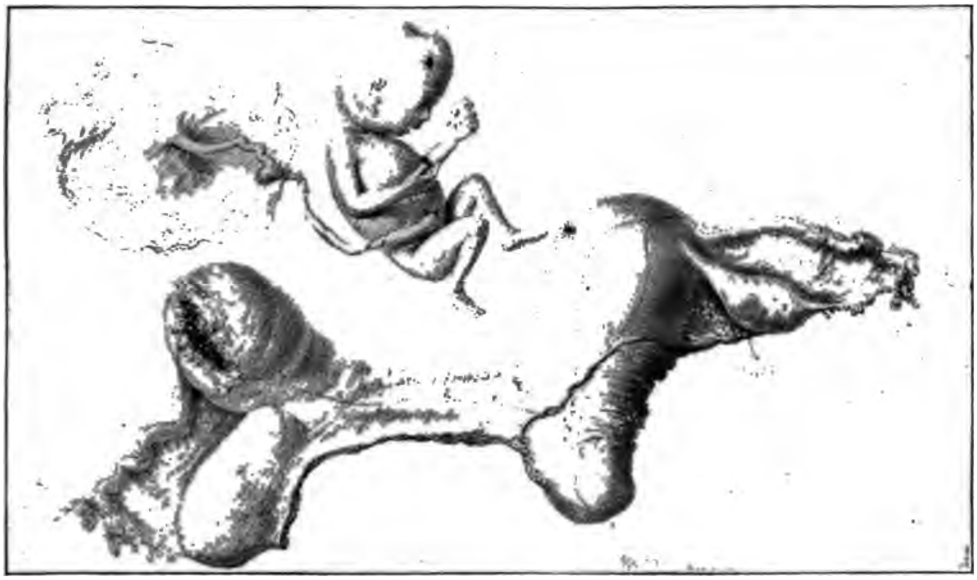


Fig. 409. Pregnancy in a Rudimentary Horn of the Uterus. As there is no communicating cavity between the uterine cavity and site of the pregnancy in the rudimentary horn, the spermatozoa evidently came by way of the opposite tube, as indicated by the small arrows. (Kelly—*Operative Gynecology.*)

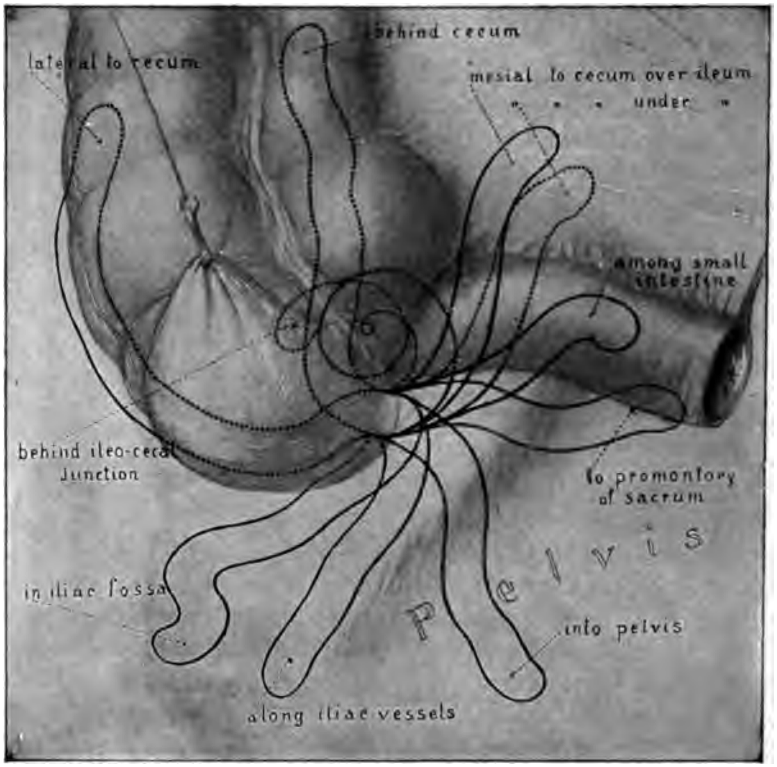


Fig. 410. Diagram showing various positions in which the Appendix vermiformis may lie, with the caecum in tne usual place. (Kelly—*Diseases of the Appendix.*)

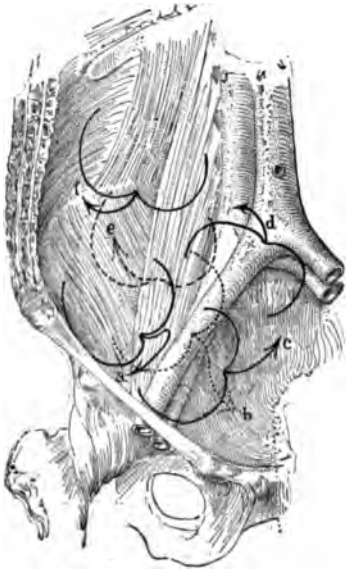


Fig. 411. Diagram showing various positions which the Caecum and Appendix may occupy, in cases where the caecum is displaced. (Kelly—*Diseases of the Appendix.*)

In cases where the caecum varies from the usual position, the appendix may be still farther from its normal position, as indicated in Fig. 411. In a case of appendicitis there may be a point of pain and tenderness elsewhere in the abdomen, in addition to that in the appendix region. Then immediately arises the question, "Do any of these additional areas of tenderness represent an additional lesion or is the pain and tenderness simply reflex from the inflamed appendix?" My friend, Dr. Leonidas Kirby, of Harrison, Arkansas, recently called my attention to the following method of identifying the reflex areas of tenderness. With the patient's knees drawn up to relax the abdominal muscles as in regular abdominal palpation, note the areas of tenderness. Then make steady pressure exactly over the appendix sufficient to cause decided pain and, while maintaining this pressure over the appendix, palpate with the other hand the areas which are tender. When the tenderness in the other areas is reflex, it disappears as long as the pressure over the appendix is maintained, to reappear as soon as the pressure over the appendix ceases. Dr. Kirby has found this simple expedient very helpful in a considerable number of doubtful cases.

13. **Fecal Mass,** in caecum and extending along the ascending colon.

14. **Tumor of Caecum.** This is usually malignant. It presents chronic irritation in the caecal region, generally leading to a diagnosis of chronic appendicitis. There are exacerbations of trouble at times, due apparently to irritation in the caecum from retained fecal material. In some cases there is a swelling in this region, that comes and goes. It is most marked usually during the days of pain and disappears largely when the bowels are well opened. Later a permanent mass appears, though it may vary considerably in size at different times, due to the varying amount of fecal material in the caecum. This same history may be present at times in chronic caecitis without a tumor, but in such a case of course there is no permanent tumor, unless there is some complicating inflammatory trouble around the caecum.

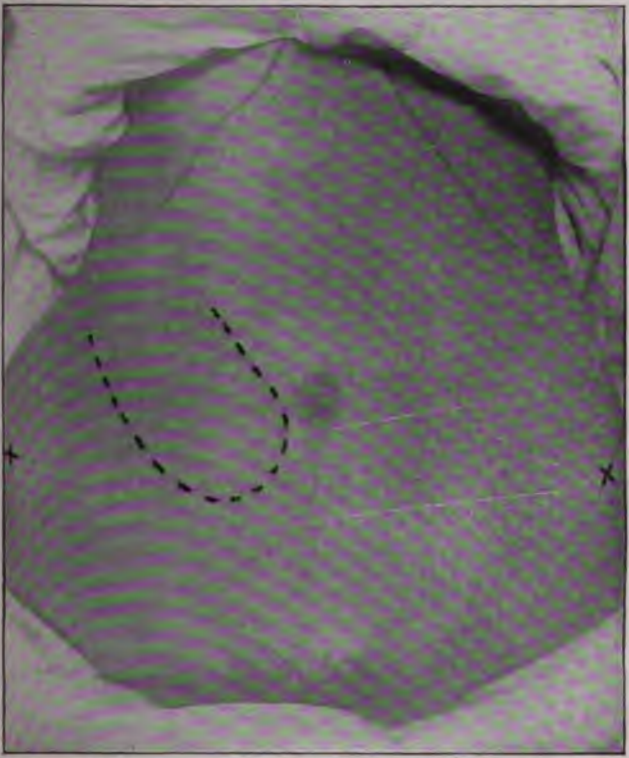


Fig. 412. Movable Kidney, showing the outline of the displaced kidney as determined by palpation. Notice that the kidney comes well below a line drawn from the umbilicus to the right anterior superior iliac spine (marked by a cross).

15. Intussusception. The mass extends along the caecum and ascending colon.

There is the history of intestinal obstruction, the passage of bloody mucus fro bowel and the rectal tenesmus. It is most frequent in children.

16. Displaced Kidney (Fig. 412). The mass has approximately the siz

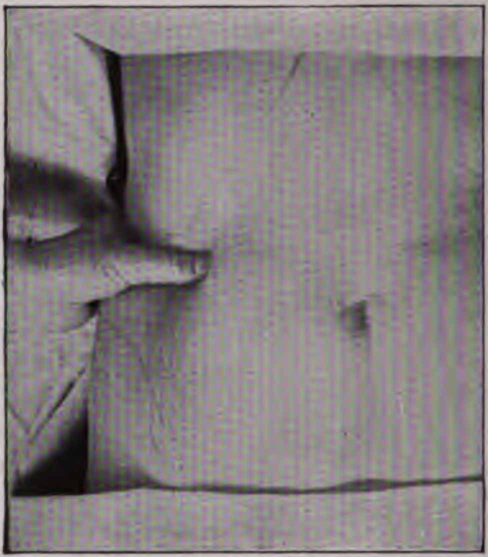


Fig. 413. Palpation of a Movable Kidney, with the patient on her back. First step. The loin is grasped as here shown, to prevent the displaced kidney from slipping unnoticed back into its place at the beginning of palpation.

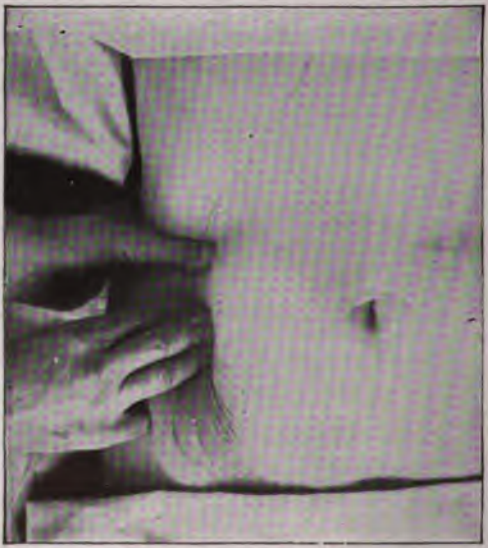


Fig. 414. Palpation of a Movable Kidney, with patient on her back. Second step. Palpating the kidney with the right hand, while it is held in displacement with the left hand.

shape of the kidney and is tender when pressed upon. Pressure usually causes a desire to urinate, and it may cause pain running along the ureter to the bladder. The prolapsed kidney is usually somewhat enlarged. Unless adherent in its malposition, it may be returned to its bed in the loin. This facility with which the kidney slips up into its bed when the patient is lying on her back, sometimes interferes with the diagnosis, for palpation then would show no displacement of the kidney. In order to prevent a prolapsed kidney from being pushed into place unawares, during palpation in the vicinity, it is well to grasp the lumbar region firmly, as shown in Fig. 413. This fixes the kidney in its abnormal position, where it can be palpated by the fingers of the other hand, as shown in Fig. 414. Another way to examine a movable kidney in its lowest position, is to palpate the loin while the patient is standing. The patient must lean forward on some support in such a way as to relax the abdominal muscles.

17. Tumor of Kidney. Such a mass may be traced up into the kidney region. If the tumor and kidney are prolapsed, they may be returned to the loin, if not adherent. There are usually dragging pains in the loin, and bladder symptoms. Urinary examination may give decisive information. A very satisfactory method of palpating the kidney region for a mass, or for deep tenderness, is to use both hands, one behind and the other in front, the lumbar structures being caught between them (Fig. 166).

18. Perinepheritic Abscess, without distinct fluctuation. This may dissect down into the lower abdomen, and even into the pelvis, and still be so deeply situated or not to give definite fluctuation, except under anesthesia. The mass may be traced up into the kidney region. There is colon resonance over it. There is marked tenderness in the lumbar region, and usually decided swelling there. There is the history and the ordinary signs of kidney disturbance, associated with the general and local evidences of suppuration.

19. Psoas Abscess, without distinct fluctuation. This causes a deep seated mass in the lower abdomen, which may give no fluctuation until it approaches the surface in the neighborhood of Poupart's ligament. As it is usually tubercular, the marked local tenderness and the high fever and chills of ordinary deep suppuration are generally absent. A careful examination, however, will show more or less fixation of the thigh. When an attempt is made to move the thigh in any direction that pulls the psoas muscle, the movement is resisted. There are also other evidences of caries of the lumbar vertebrae.

20. Enlarged Liver or Solid Tumor of Liver. The liver occasionally becomes so enlarged from disease or abscess formation that its lower border is pushed into the right lower abdomen. The direct connection of the mass with the usual liver dullness may be demonstrated, and the lower border and left border of the mass has the shape of the liver and there is a history indicating liver disease. A tumor from the liver usually lies in front of the intestines and its connection with the liver may be directly shown by palpation and percussion. Also, there is a history of liver disturbance.

21. Movable Liver. Exceptionally the liver may be so movable that it sinks into the lower abdomen. The mass lies in front of the intestines, has the shape of the liver and may be returned into the liver region unless adherent.

22. Tumor of Abdominal Wall (Fig. 124). This is a rare condition, and for that reason it is likely to be forgotten, resulting in a mistaken diagnosis. The distinguishing signs of a tumor of the abdominal wall are given in the first part of this chapter (page 121).

23. Inflammatory Mass in Abdominal Wall. This presents about the same signs as a tumor of the wall, with evidences of inflammation added.

24. Tumor of Round Ligament. It arises somewhere in the course of the round ligament, either in the pelvic cavity or in the inguinal canal. If large, it necessarily produces great distortion of the parts. It may cause much confusion in diagnosis if the fact be not remembered that a tumor occasionally arises from this ligament.

25. Some Central Abdominal Mass. One of the firm masses mentioned as usually appearing in the central abdomen, may be displaced to one side or may become so large that it extends far over to both sides.

26. Mass from Opposite Side. Occasionally an enlarged organ or a tumor from one side, will become so much displaced as to appear to belong to the other side.

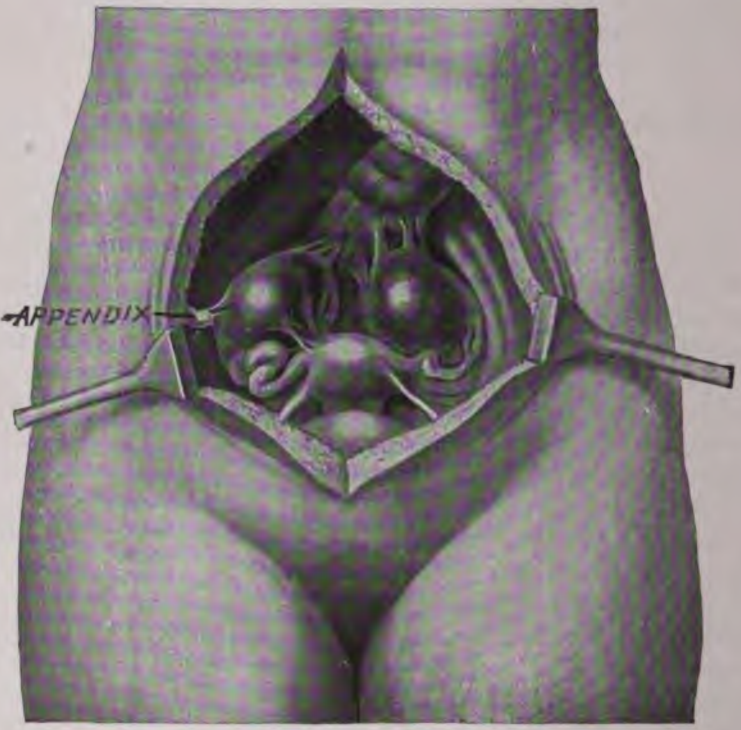


Fig. 415. Double Pyosalpinx with adhesions. (Montgomery—*Practical Gynecology*)

B. Mass, High in Right Side, Contains Fluid.

1. Uterus Displaced. The fluctuation may be due to pregnancy or, very rarely, to pyometra or to hematometra.

2. Pyosalpinx (Figs. 415, 416, 417). There is a tender mass in the tubo-ovarian region, with slight or well-marked fluctuation. The mass is fixed and the uterus also is fixed. There may be a large amount of firm exudate or very little. There is usually a clear history of infection followed by the usual evidences of pelvic inflammation, including persistent endometritis with discharge. If the trouble is gonorrhoeal, the symptoms may be mild, and if of long standing the pus-tube may not be very tender. But there is more tenderness and more thickening and fixation than occurs with hydrosalpinx or ovarian cyst or parovarian cyst.

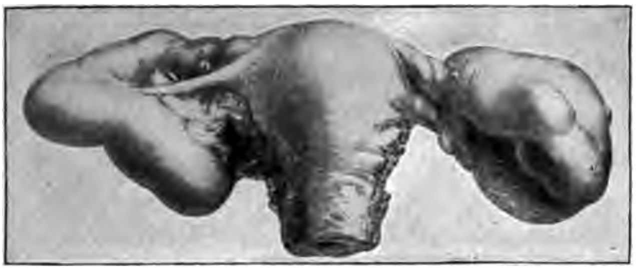


Fig. 416. Pyosalpinx with no adhesions. (Kelly—*Operative Gynecology*.

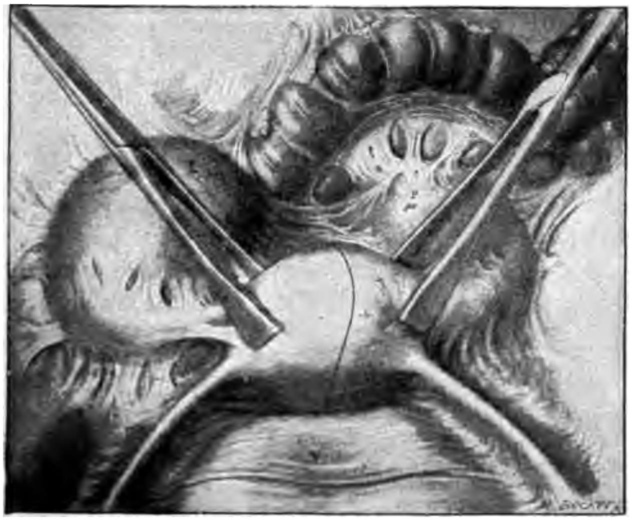


Fig. 417. Pyosalpinx with very extensive adhesions. (Kelly—*Operative Gynecology*.)

3. Ovarian Abscess. This presents practically the same history and the same signs as a tubal abscess. In fact, it is sometimes impossible to say with absolute certainty whether the pus is in an enlarged tube or an enlarged ovary. As the former is the usual condition, we assume in a given case, that the pus is in the tube, unless there is something special pointing otherwise. Occasionally in an abscess in this region, the form can be made out as distinctly round (probably ovary) or distinctly long and sausage-shaped (tubal).

4. Tubal Pregnancy. This presents the history and examination signs of an inflammatory mass, with the history and progress of tubal pregnancy. There is, in the class of cases now under consideration, sufficient fluid blood encapsulated somewhere to give fluctuation, either about the tube or in the posterior cul-de-sac.

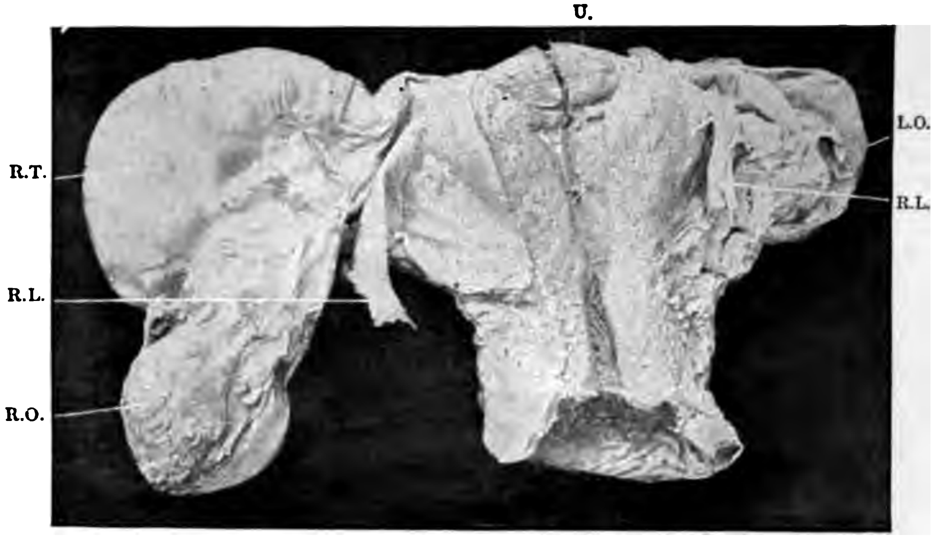


Fig. 418. Right Hydrosalphinx. U. Uterus split open. R.T. Right Tube, distended with fluid (hydrosalphinx). R.L. Round ligaments. R.O. Right ovary. (Keating and Coe—*Clinical Gynecology.*)

5. Pelvic Tuberculosis. There are the signs of a chronic inflammatory mass, with a collection of fluid (tubercular pus), and the history and progress of the case present the characteristics of local tuberculosis, as explained in chapter XI.

6. Hydrosalpinx (Fig. 418). About the same as ovarian cyst except that it is oblong and extends from the uterus to the pelvic wall and is attached along the border of the broad ligament. The signs are much like those due to parovarian cyst, except that the hydrosalpinx is situated high while still small. There may or may not be a history of pelvic inflammation at any time. Its intimate attachment to the uterine horn is an important diagnostic point.

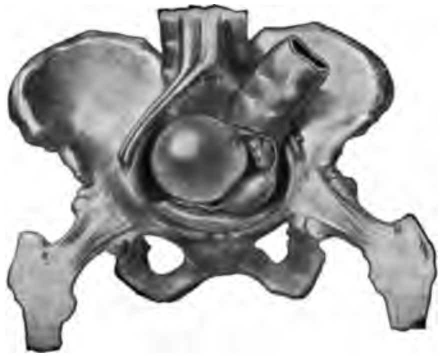


Fig. 419. Ovarian Cyst of Right side, displacing uterus to the Left. (Montgomery—*Practical Gynecology.*)

7. Ovarian or Parovarian Cyst (Figs. 419, 420). A fluctuating mass, somewhat movable, of slow growth, with no acute symptoms if not complicated, unless caught in the pelvis, and there is considerable abdominal enlargement before very troublesome symptoms appear. The mass is attached in the pelvis and, by further examination, its attachment may be traced to the tubo-ovarian region.

8. Cystic Fibroid. The greater portion of the mass is usually solid and presents the characteristics of a uterine fibroid.

9. Large Perityphlitic Abscess. Presents the history of appendicitis with persistent septic symptoms, and the evidences of a pus collection in the vicinity of the caecum.

10. Cystic Tumor of Kidney. The tumor may be traced up toward the loin. It is freely movable usually, unless there has been inflammation about it. Good fluctuation is not obtained through a moderately thick abdominal wall, unless there is some large cavity or a number of small ones with very thin walls. The tumor may be made up of innumerable small cysts and yet, in the ordinary examination, appear as a solid tumor. Under anesthesia the fluctuation may usually be distinctly made out. Tenderness is slight unless there is complicating inflammation. The enlarged kidney is usually displaced downward considerably, so that there is room in the loin up into which it may be pushed. The colon lies over the mass, between it and the abnominal wall. This may not be apparent at first, the colon being flattened out against the wall and causing no resonance on percussion. The fact that the colon is over the mass is easily demonstrated by inflating the rectum and colon with air. This was necessary in the case of the tumor shown in Fig. 204 (see also Figs. 202 and 203).

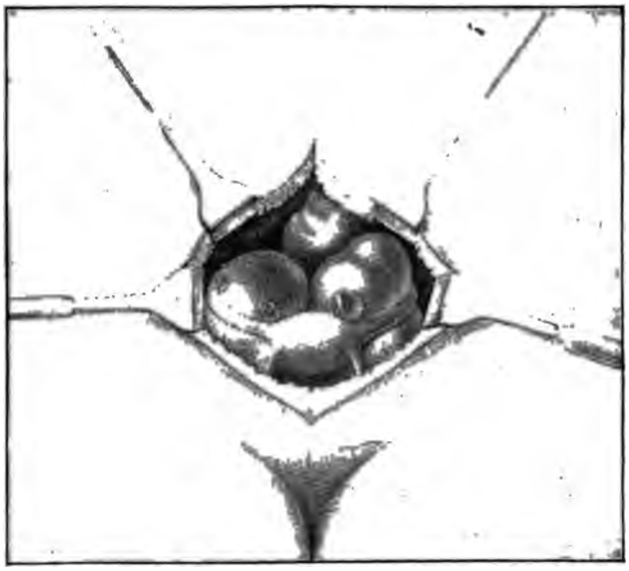


Fig. 420. Graafian-Follicle Cysts of the ovaries, which have become intraligamentary. (Kelly—*Operative Gynecology.*)

11. Hydronephrosis and Hydro-ureter. Occasionally the kidney and ureter on one side will become very much dilated, forming a sac filled with fluid (urine). There is usually a history of kidney pains and bladder disturbance extending over a long period and varying much at different times. The characteristic feature is that the sac fills at times, producing a swelling with more or less tension and pain, and then after a variable time there is a discharge of a very large quantity of urine with disappearance of the swelling and relief of the symptoms. After a time the sac fills again and discharges. A crucial point in the diagnosis of such a condition is the coincidence of the disappearance of the swelling and the discharge of an extraordinarily large quantity of urine. Too much dependence should not be placed on the history, as it is more or less uncertain and may lead to an erroneous conclusion. Before the patient is subjected to operation, in cases where the symptoms are not urgent, she should be required to make daily measurements of the amount of the urine passed during one of the periods of appearance and disappearance of the swelling, in order that any marked increase in the amount of urine, as the swelling disappears or diminishes, may be known positively.

12. Pyonephrosis. When the dilated kidney or ureter becomes filled with pus, there is marked disturbance, with fever, chills, pains extending from kidney to bladder, usually marked bladder disturbance and definite urinary findings. Palpation of the kidney and along the course of the ureter gives marked tenderness. An important feature in these cases of painful kidney trouble is the point-tenderness on deep pressure in the lumbar just over the kidney (Fig. 164). This helps to differentiate kidney-tenderness from tenderness due to appendiceal or other intraperitoneal inflammation, which differentiation may in some cases be practically impossible by palpation in front. Usually, however, careful palpation in front will show clearly that the tenderness is in the kidney and along the course of the ureter.

13. Perinephritic Abscess, large enough to give fluctuation. This may burrow into the pelvis or towards Poupart's ligament. It gives deep fluctuation and presents the symptoms and signs of deep suppuration in the kidney region.

14. Psoas Abscess, large enough to give fluctuation. This may burrow into the pelvis, or beneath Poupart's ligament to the femoral opening. It presents fluctuation, both superficial and deep, and gives the symptoms and signs of tuberculosis of the lumbar vertebrae with involvment of the psoas muscle.

15. Dilated Gall-bladder. Occasionally the gall-bladder becomes so greatly enlarged and displaced, that it extends into the lower abdomen. The connection of the fluctuating mass with the liver may be traced, and there is a history of gall-stone disease or other liver disturbance.

16. Central Abdominal Affection. One of the cystic masses mentioned as usually appearing principally in the median line, may be displaced to one side or may become so large that it extends far over to both sides.

17 Mass from Opposite Side. Occasionally a cystic mass from one side will become so much displeased that it appears to belong to the opposite side. Some months ago I operated on such a case. There was an ovarian cyst extending to the umbilicus. The history indicated that it had been unusually movable, occupying various positions in the lower abdomen. When I saw the patient she had been sick in bed several days with abdominal pains and evidences of a mild peritonitis. The large fluctuating mass occupied the left and central portions of the lower abdomen and pelvis. The small uterus was crowded into the posterior part of the pelvis behind the cyst. The cystic mass was not very tender, but it was fixed immovably by adhesions. From its location there seemed no room for doubt that it arose from the left side. On opening the abdomen, however, I found that it was a right ovarian cyst which had fallen over to the left side in front of the uterus. The pedicle had become twisted, with resulting hemorrhage into the cyst and fibrinous peritonitis about it. To the torsion of the pedicle, with the resulting hemorrhage and peritonitis, were due the acute symptoms and the recent fixation of the cyst.

MASS HIGH, in Pelvis or Lower Abdomen, LEFT Side.

A. Mass or Induration FIRM.

Same as on right side, substituting Sigmoid flexure for Caecum, and Spleen for Liver, and leaving out Appendicitis.

B. Mass Contains FLUID.

Same as on right side, substituting Cyst of Spleen for dilated Gall-Bladder, and leaving out Perityphilitic Abscess.

MASS HIGH and in MEDIAN LINE

IN PELVIS OR LOWER ABDOMEN OR CENTRAL ABDOMEN.

A. Mass or Induration FIRM.

Any of the solid masses mentioned as occurring in the Right or Left side, may extend to the Median line or across it.

There are, however, certain firm masses that arise in or near the median line and, consequently, may be classed as belonging to this median region.

1. **Solid Tumor of Uterus.** Fibroid tumors are the most frequent cause of firm enlargement of the uterus, though occasionally a malignant tumor of the corpus uteri will cause marked enlargement. The characteristics of these have already been given. There may exceptionally be both carcinoma and fibroid (Fig. 421).
2. **Abdominal Pregnancy and Lithopedion** (Figs. 422, 423, 424).
3. **Solid Tumors of Omentum, Small Intestine or Mesentery.** These usually appear near the median line, and the signs vary with the location. The diagnosis rests upon the presence of a mass presenting the symptoms and signs to be expected in a tumor from one of these structures, and for which no more-common disease would account. Such tumors usually are accompanied by gastro-intestinal symptoms.
4. **Tumor of Pancreas.** A deep-seated mass in the median line, accompanied by decided evidences of pancreatic disturbance, and presenting symptoms and signs for which nothing else will account.

5. Retroperitoneal Tumor (Fig. 201). It lies back of the intestines, is rather movable, more so than would be expected from a pancreatic tumor, and is without evidences of disturbance of any particular organ.

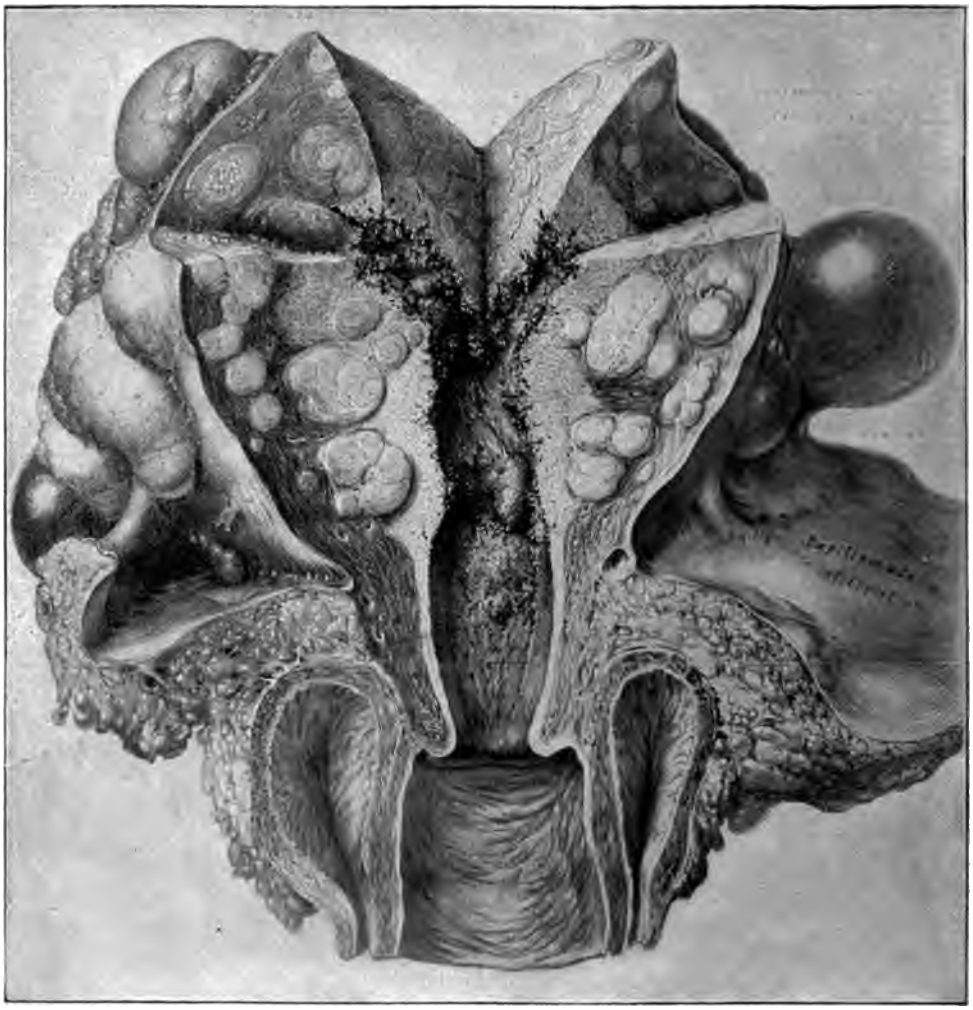


Fig. 421. Large Mass in Pelvis formed by Uterine Fibroids and Carcinoma. (Cullen—*Cancer of the Uterus.*)

6. Enlarged Lymphatic Glands. This condition presents the evidences of a retroperitoneal or mesenteric mass, accompanied with a disease causing glandular enlargement, such as Hodgkin's disease, or with recent ulceration in the intestine (tubercular or typhoid).

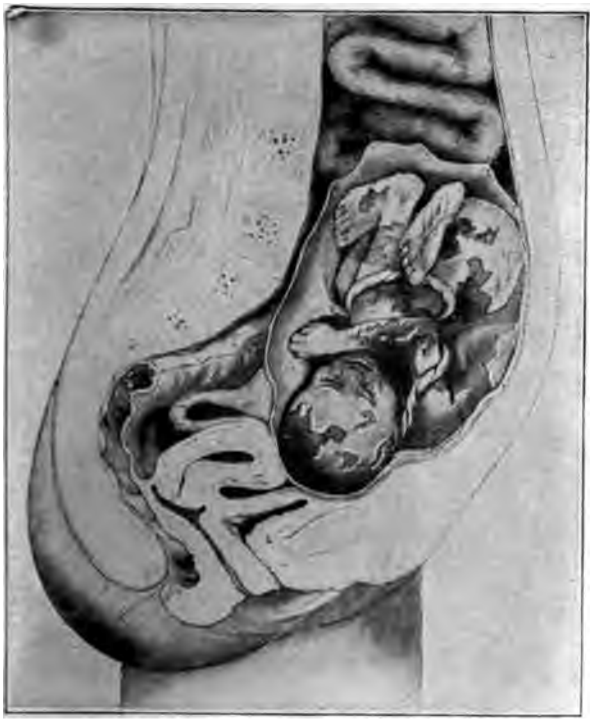


Fig. 422. Extrauterine Pregnancy near full term. (Dudley—*Practice of Gynecology*.)

7. Tubercular Peritonitis, without enough fluid to given fluctuation. Tubercular inflammation, with the exudate and resulting mass, may occur at any part of the peritoneal cavity, but is likely to extend into the median line, if not there primarily. The patient presents the evidences of a chronic or subacute peritonitis with nothing else to account for it, and the presence of tuberculosis in the intestines or in the lungs.

8. Displaced Abdominal Organ. Several cases are

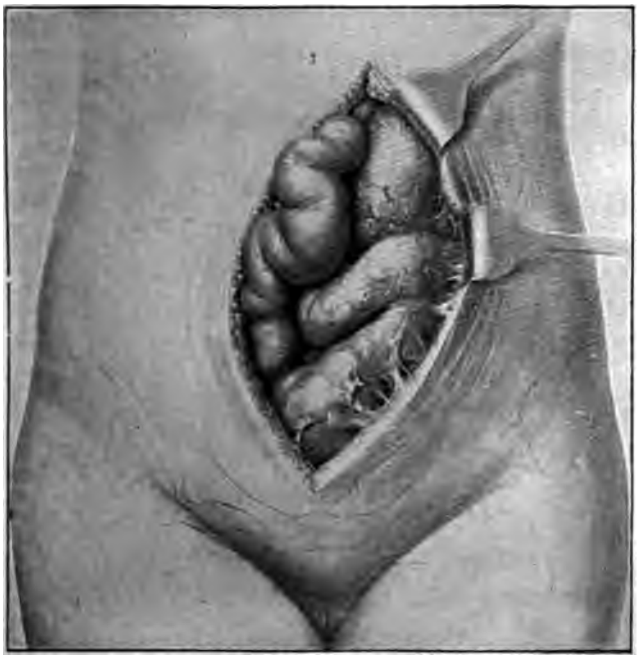


Fig. 423. Extrauterine Pregnancy with Lithopedion. Showing the Lithopedion in situ. (Kelly—*Operative Gynecology*.)

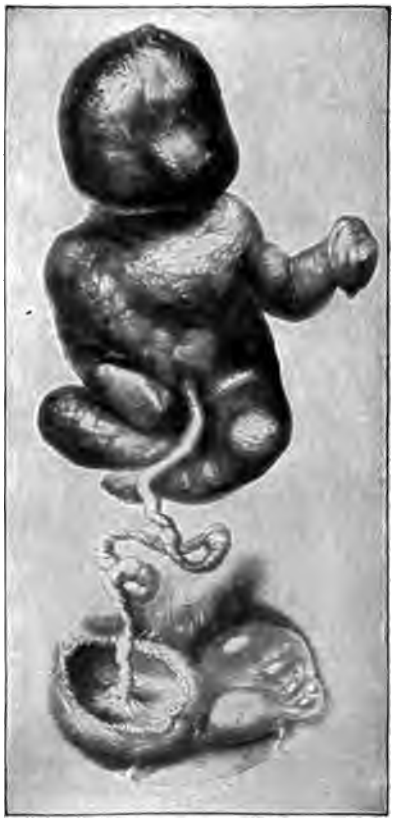


Fig. 424. Showing the Lithopedion removed, and also the site of the Tubal pregnancy. (Kelly—*Operative Gynecology*.)

rded in which a displaced organ, such as the kidney (Fig. 425) or the spleen, led to an erroneous diagnosis and an erroneous operation.

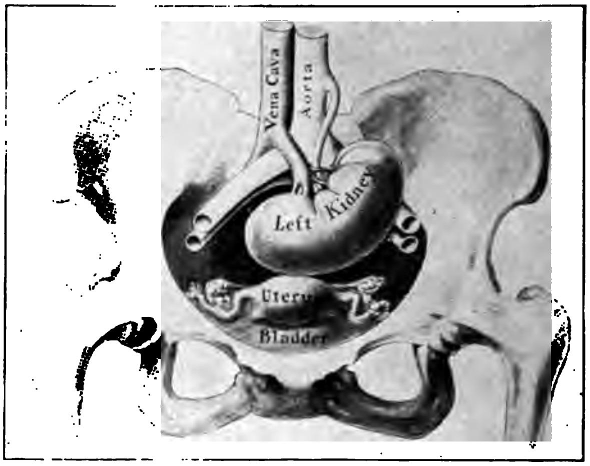


Fig. 425. The Kidney Displaced into the Pelvis. (Dudley—*Practice of Gynecology*.)

B. Mass, High and in Center, Contains Fluid.

ny of the fluid masses mentioned as occurring in the Right or Left side, may nd to the Median line or beyond it.

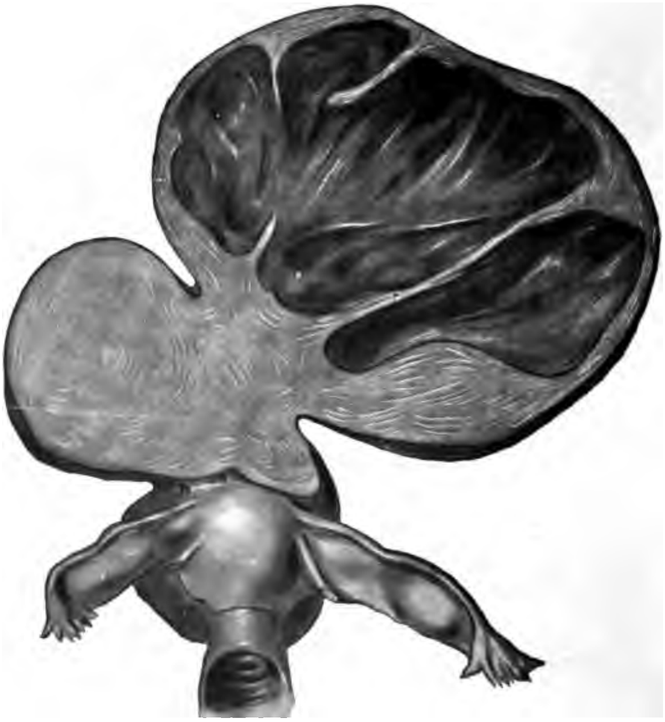


Fig. 426. A Large Cystic Fibroid. (Montgomery—*Practical Gynecology*.)

There are, however, certain fluctuating masses that arise in the median line and hence may be said to belong to this region.

1. Pregnant Uterus. This may be any size, may be normal or abnormal, and the shape of the uterus may be regular or irregular.

2. Cystic Fibroid (Fig. 426). It presents the evidences of a fibroid along with fluctuation in a part of it. Where such a condition is found, be careful to exclude pregnancy complicating the fibroid.

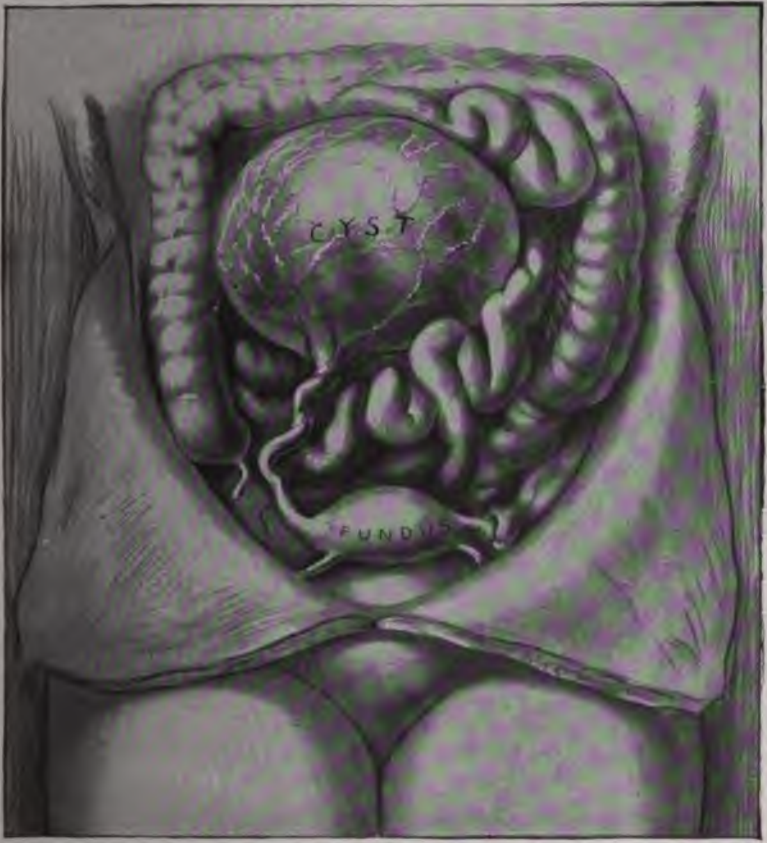


Fig. 427. Ovarian Cyst with a long slender pedicle. (Montgomery—*Practical Gynecology*.)

3. Distended Bladder (Fig. 140). This may cause much confusion in examination and diagnosis. The diagnostic points have already been given. It has happened that the unrecognized distended bladder ruptured with fatal results (Fig. 141).

4. Ovarian or Parovarian Cyst (Figs. 427, 428). The diagnostic points have been given briefly in this chapter, and are given in detail in chapter XII.

5. Ascites. For the differential diagnosis of ascites, see text and illustrations under Percussion in this chapter (page 157).

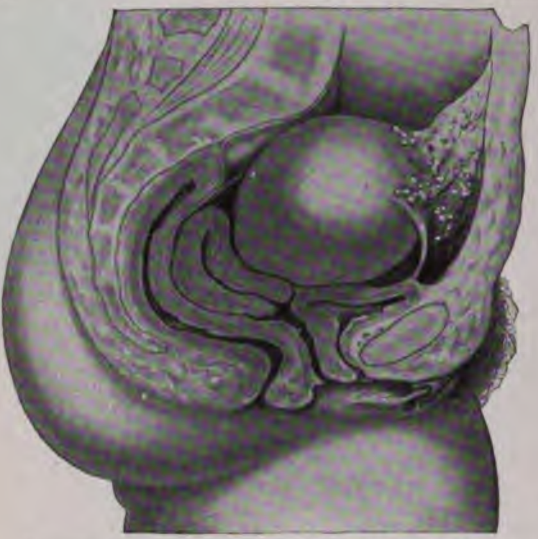


Fig. 428. Dermoid Cyst filling front of pelvis and displacing the uterus backward. (Montgomery—*Practical Gynecology.*)

6. Ascites and Tumor (Fig. 429). The important percussion signs of ascites and tumor have already been mentioned and illustrated in this chapter (see Figs. 194, 195, 196.)

7. A Cystic Tumor of Omentum, Intestine or Mesentery. A considerable number of cystic tumors of the omentum and mesentery have been reported. Such tumors may cause much confusion in diagnosis, unless it be kept in mind that they may be encountered. The symptoms and signs they present depend on the situa-

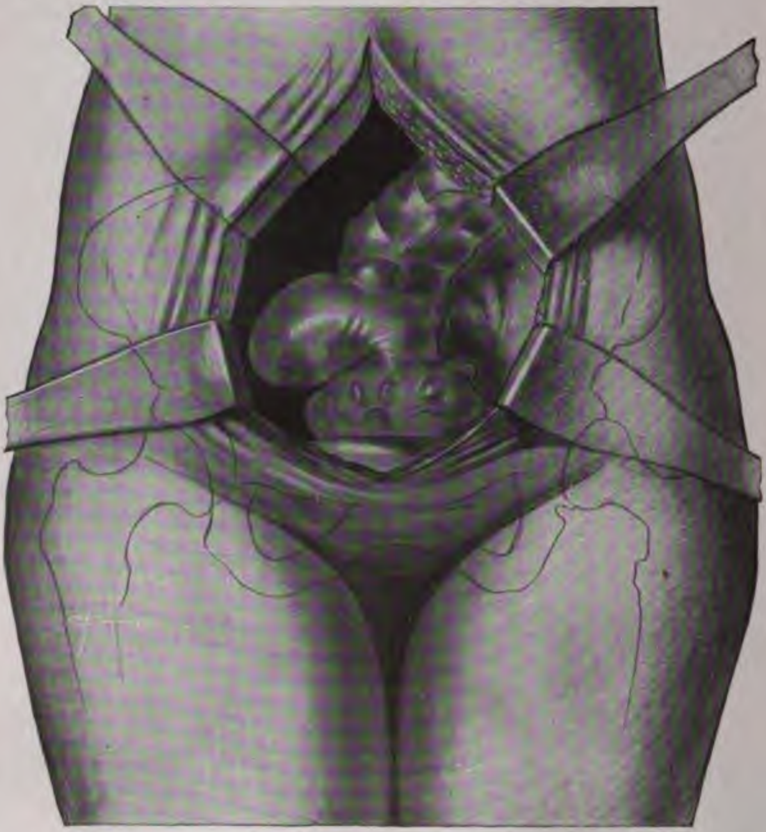


Fig. 429. Ascites and Fibroid. The combination closely simulated pregnancy. The abdomen was distended with a Fluid Mass having a Solid Mass inside, and the peculiarly shaped fibroid gave ballottement. (Montgomery—*Practical Gynecology.*)

tion, and may be worked out for the different situations by a consideration of the surrounding structures and the signs that would likely result. The diagnosis depends largely on the exclusion of the more common conditions.

8. **Pseudo-cyst of the Lesser Omental Cavity.** This is usually preceded some months by an abdominal injury involving the pancreas. It is likely to be of rather slow growth, and the injury may be overlooked unless the history is carefully inquired into. In all cystic masses of doubtful character near the center of the abdomen, this should be thought of.

9. **Cyst of Pancreas.** A true cyst of the pancreas may present much the same symptoms and signs as the pseudo-cyst of the lesser omental cavity resulting from an injury of the pancreas. I cannot take the space to give in detail the differential diagnosis of these various upper abdominal conditions. I wish simply to call attention to the conditions that may be encountered, and the presence or absence of which must be determined by the examiner through further study.

10. **Cyst of Urachus.** This and other rare abnormalities are occasionally met with. A cyst of the urachus is found in or near the median line, and between the peritoneum and the anterior abdominal wall. It may communicate with the umbilicus, causing an intermittent discharge there, or with the bladder or with neither.

POINTS in the DIFFERENTIAL DIAGNOSIS

OF VARIOUS MASSES IN THE PELVIS OR LOWER ABDOMEN.

The majority of mistakes in diagnosis are due not so much to want of knowledge as to lack of application of the knowledge possessed. A diagnosis in a difficult case implies (first) a careful examination, by which are obtained the essential facts of the case, and (second) correct reasoning and a logical conclusion, based on those facts. A mistake in diagnosis may be due to failure to get all the essential facts—some important points being overlooked. In order to prevent this in the class of cases under consideration (presenting a mass in the pelvis or lower abdomen), I give the following table of points to be considered. In a difficult case, consult this table and notice whether or not you have obtained the information available on the various points mentioned.

Examination Findings.

1. Position of Mass.
2. Size.
3. Shape.
4. Consistency.
5. Tenderness.
6. Mobility.
7. Attachments.
8. Apparent point of origin.
9. Relation to uterus.
10. Position of uterus.
11. Size of uterus.
12. Shape of uterus.
13. Consistency of Uterus.
14. Tenderness of uterus.
15. Mobility of uterus.
16. Discharge from uterus.
17. Discoloration of cervix or vagina.
18. Relation of mass to tube and ovary.
19. Relation of mass to pelvic wall.
20. Relation of mass to vaginal wall.
21. Bladder (full, distended, urinary incontinence, induration in bladder, pain on pressure).

22. Rectum (containing fecal masses, or indurated or painful on pressure).
23. Mass elsewhere (arising from uterus or about tube or along colon.)
24. Colon or small intestine between mass and abdomen wall.
25. Outline of dullness.
26. Shifting of outline of dullness.
27. Hard masses within a cystic mass.
28. Pulsation of mass, felt on examination.
29. Fetal movements, felt on examination.
30. Vascular murmur heard.
31. Fetal heart-sounds heard.
32. Fever present.
33. Emaciation or fat deposition.
34. Breast disturbance (tenderness, enlargement, enlarged veins with milk formation).
35. Evidence of disease of heart, lungs, liver, kidneys, gastrointestinal tract, spleen, pancreas, nervous system.

History and Subjective Symptoms.

36. Manner of onset, prominent symtoms and apparent cause.
37. General course since.
38. Menstrual disturbance.
39. Intermenstrual bloody discharge.
40. Leucorrhoea.
41. Pain in lower abdomen or pelvis (pressure, aching, sharp pain) or about external genitals, or backache (sacral, lumbar, loin) or thigh pains.
42. Fever.
43. Disability.
44. Variation in weight.
45. Abdominal enlargement.
46. Morning sickness, or persistent nausea or vomiting at other times.
47. Breast disturbance—pains, tentenderness, enlargement, pigmentation, enlarged veins, milk formation.
48. Bladder or rectal disturbance, preceding or accompanying the trouble.
49. Evidence of disease of the heart, lungs, liver, kidneys, gastrointestinal tract, spleen, pancreas, nervous system.

Progress Under Observation.

50. Steady increase or decrease, or exacerbations, etc.

If Examination Under Anesthesia Notice:

51. Exact position of mass.
52. Exact size and shape.
53. Consistency throughout.
54. Exact mobility.
55. All the attachments.
56. Point of origin.
57. Exact relation to adjacent organs,
    - to uterus,
    - to Fallopian tubes,
    - to ovaries,
    - to rectum,
    - to colon.
58. Uterus—exact position, size, shape, consistency, (tenderness not appreciable), mobility, attachments.
59. It may be advantageous to make recto-abdominal examination also.
60. If cervix is suspicious of malignant disease, excise a piece for microscopic examination.

If Necessary for Diagnosis, and Permissible Under the Conditions Present, Explore the Uterine Cavity:

61. With sound, to determine depth and direction.

62. With curet, to secure tissue for microscopic examination.
3. With finger, to determine consistency of uterine wall (softened area, hard nodule) and presence of retained placental remnants or projecting polypoid growths.

POINTS IN THE SPECULUM EXAMINATION.

In the speculum examination, direct inspection is made of the vaginal wall and e cervix.

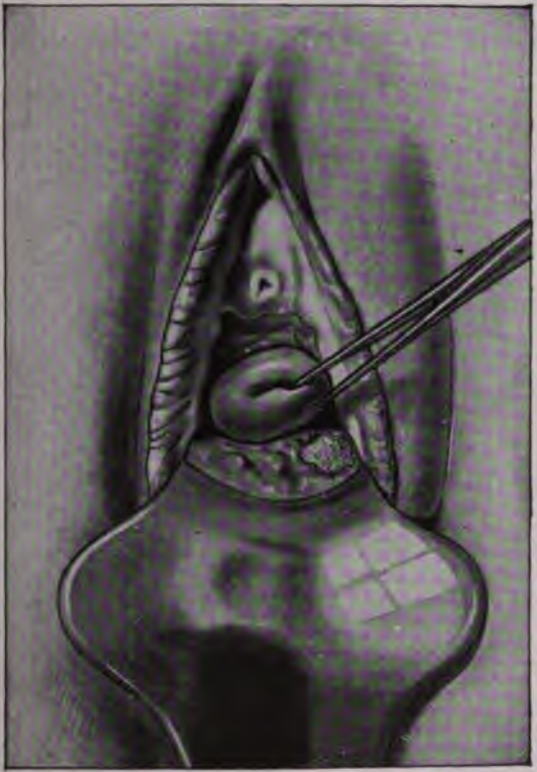


Fig. 430. Primary Malignant Ulceration of the Vagina. (Montgomery—*Practical Gynecology*.)

Conditions of Vaginal Wall.

The vaginal wall may present arterial congestion, venous congestion, bleeding reas or distinct ulceration.

Arterial Congestion of the Vaginal Wall indicates inflammation, usually acute, or ctive irritation, as by an irritating discharge or pessary or other foreign body. he differential diagnosis of the various forms of vaginal inflammation has already een given in this chapter, when considering leucorrhoea (see page 177). Occasionally here are cases of chronic vaginitis in which there is arterial congestion in spots. In such chronic cases there is likely to be infiltration and hypertrophy of the congested areas, giving rise to the condition known as granular vaginitis.

Venous Congestion of the Vaginal Wall should always arouse a suspicion of pregnancy, for that is the most common cause. It may be caused, also, by a tumor or other pelvic mass that interferes with the vaginal circulation, or by extra-pelvic conditions that cause venous stasis in the pelvis, such as heart disease with failing compensation.

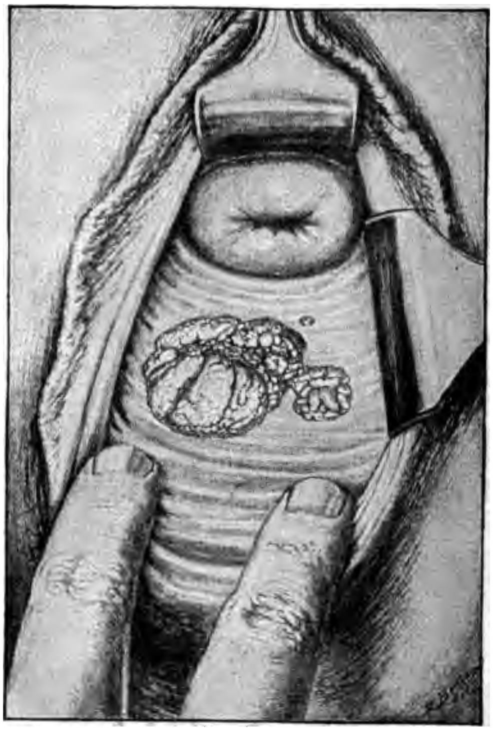


Fig. 431. Secondary Malignant Ulceration of the Vagina. In this case there was a carcinoma of the endometrium, and the discharge caused an implantation carcinoma where the cervix came in constant contact with the posterior vaginal wall. (Kelly—*Operative Gynecology*).

Bleeding Areas on Vaginal Wall, without a distinct ulcer, are found principally in senile or adhesive vaginitis, which is described in chapter IV.

A Distinct Ulcer on the Vaginal Wall may be simple, chancroidal, syphilitic, tubercular or malignant. In the case of a malignant ulcer, it may be primary on the vaginal wall (Fig. 430) or it may be secondary (Fig. 431), the most common source of secondary malignant ulceration of the vaginal wall being carcinoma of the cervix uteri.

Conditions of Cervix Uteri.

The appearance of the **normal** virgin cervix is shown in Figs. 432 and 433. The appearance of the approximately normal cervix in the parous woman is shown in Fig. 434, and a cervix that has undergone the senile atrophy is shown in Fig. 435. Fig. 436 shows **discharge** from an unlacerated cervix, while Fig. 437 shows discharge

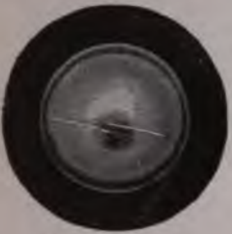


Fig. 432.

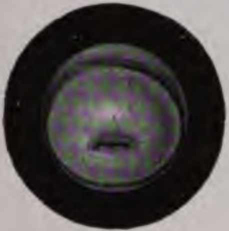


Fig. 433.

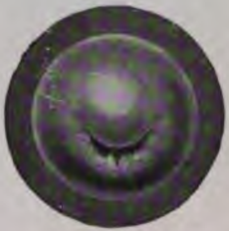


Fig. 434.

Fig. 432 and 433, Varieties of Normal Cervix in the Virgin. Fig. 434, Cervix of Multipara. (Norris, after Heitzmann—*American Text-book of Obstetrics.*)

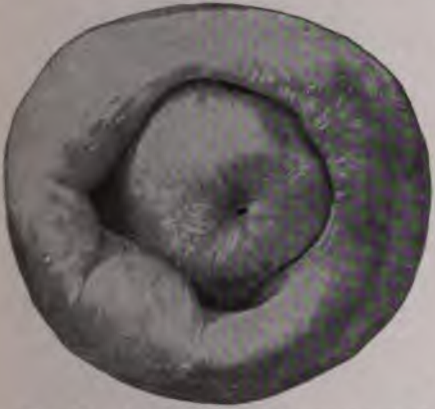


Fig 435. A Senile Cervix, with upper part of vagina. (Edgar—*Practice of Obstetrics.*)

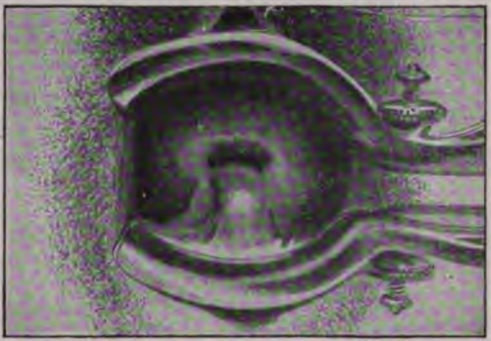


Fig. 436. Discharge from the Cervix Uteri, as seen through the speculum. (Massey—*Conservative Gynecology.*)

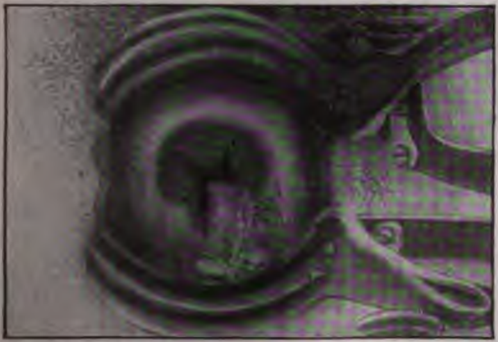


Fig. 437. Discharge, with Laceration and Erosion of the Cervix. (Massey—*Conservative Gynecology*).

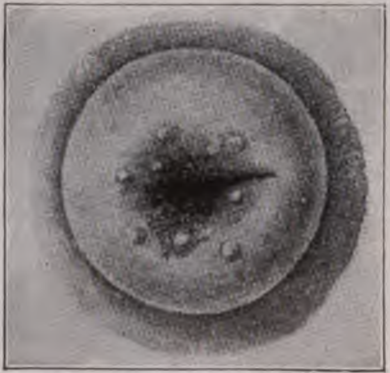


Fig. 438. Erosion of the Cervix, with a few scattered cysts. (H. MacNaughton-Jones—*Diseases of Women.*)

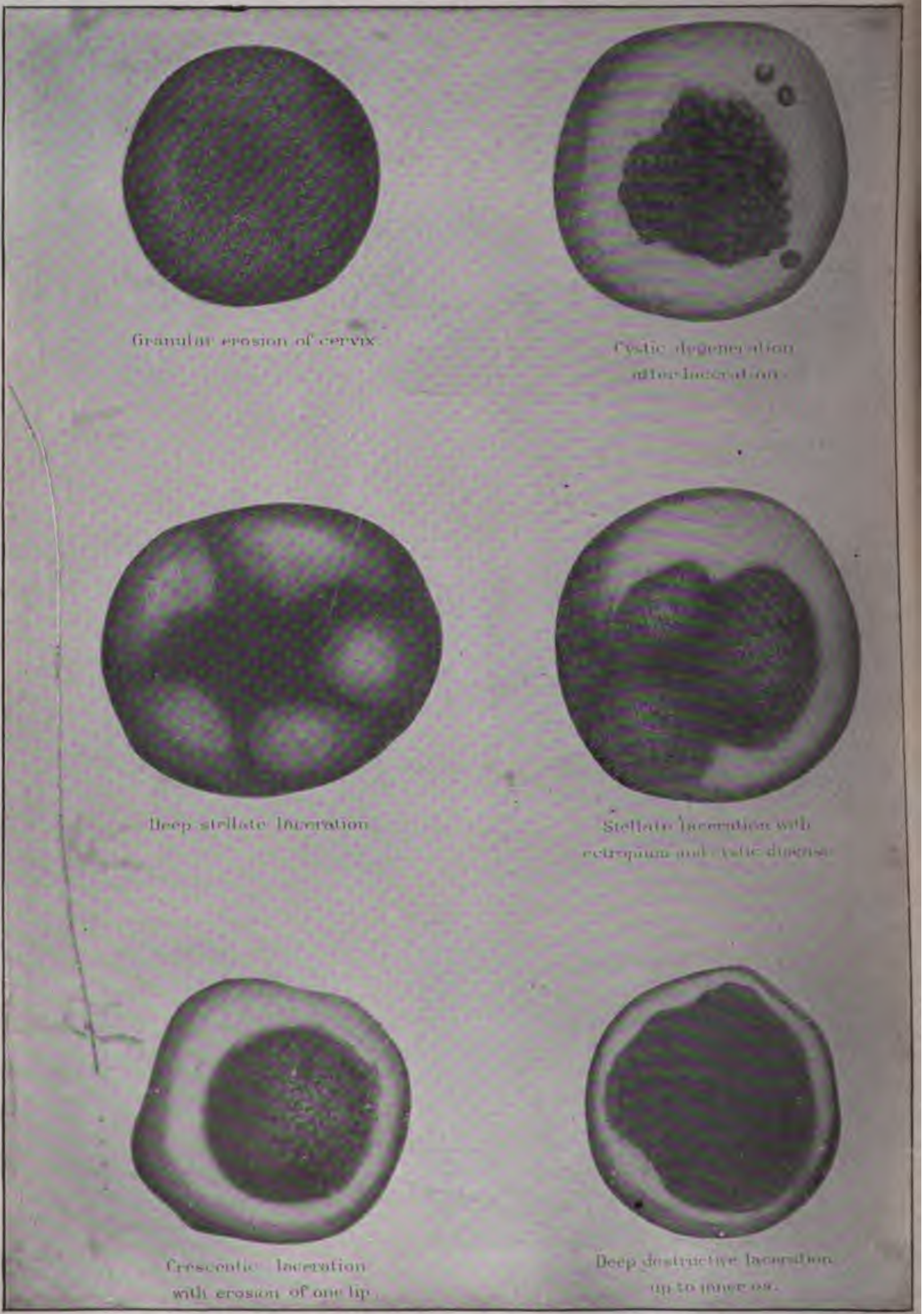
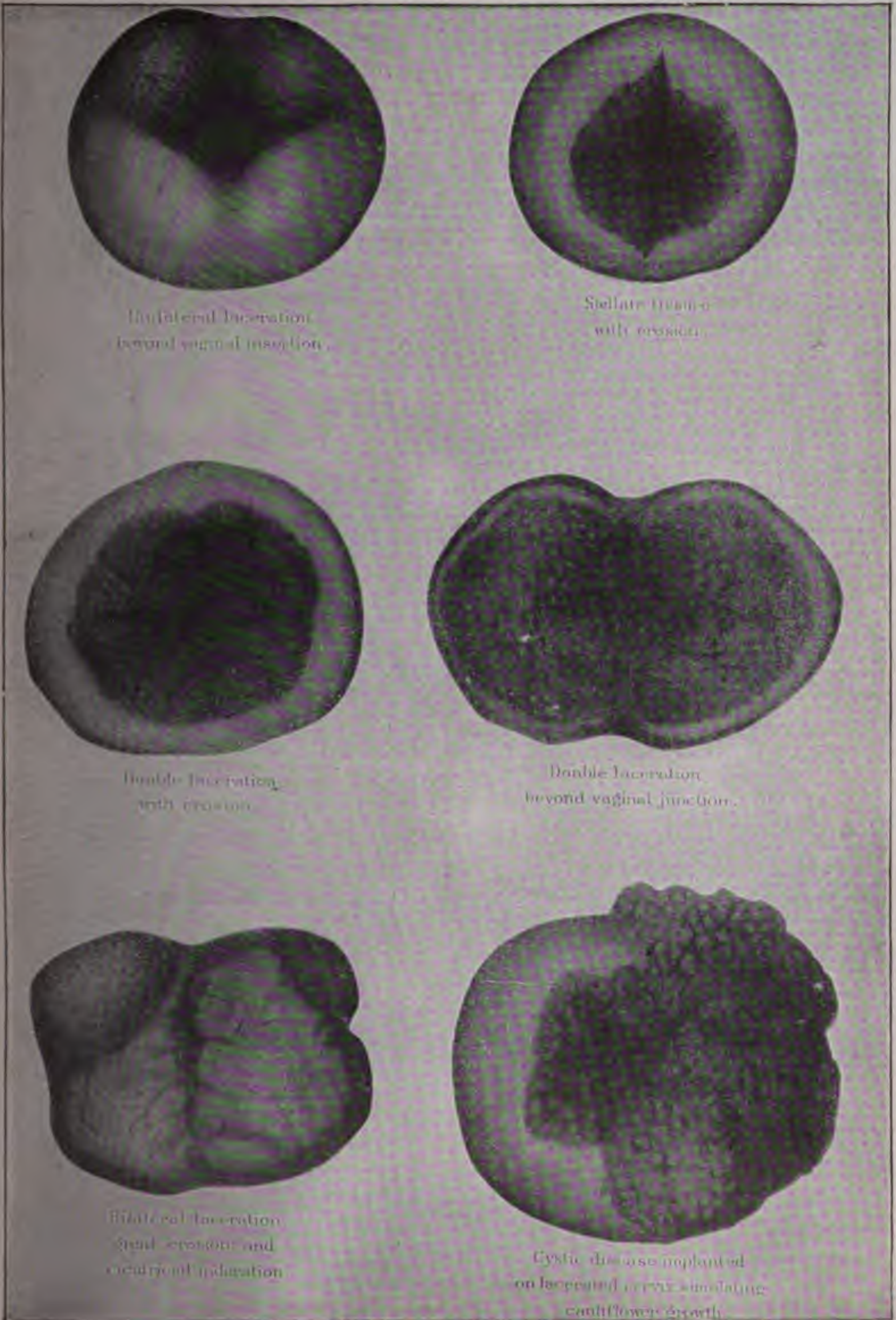

Granular erosion of cervix.
Cystic degeneration after laceration.
Deep stellate laceration
Stellate laceration with ectropium and cystic disease.
Crescentic laceration with erosion of one lip.
Deep destructive laceration up to inner os.

Fig. 439. Lacerations and Erosions of the Cervix. (Mann—*American System of Gynecology.*)



Unilateral laceration
beyond vaginal insertion.

Stellate fissure
with erosion.

Double laceration
with erosion.

Double laceration
beyond vaginal junction.

Bilateral laceration
and erosion and
cicatricial induration

Cystic disease implanted
on lacerated cervix simulating
cauliflower growth

Fig. 440. Lacerations and Erosions of the Cervix. (Mann—*American System of Gynecology.*)

and laceration. Erosion of the cervix is a very common condition, being present to a greater or less extent in most cases where there is an irritating discharge. Fig. 438 shows erosion of the cervix, the shaded area extending out from the external os representing the red angry-looking erosion. A few small glandular cysts are also visible. Various appearances of lacerated cervix, as seen through the speculum, are shown in Figs. 439, 440. In a considerable proportion of cases, distinct lips are not at first apparent, the lacerated cervix having the appearance of a ball (Figs. 552, 441). In such a case, if the anterior and posterior portions of the cervix be caught with a forceps or tenaculum and brought together, as indicated in Fig. 442, the extent of the laceration becomes apparent.

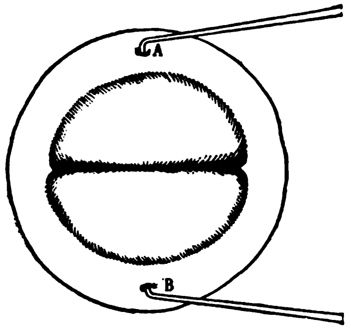


Fig. 441.

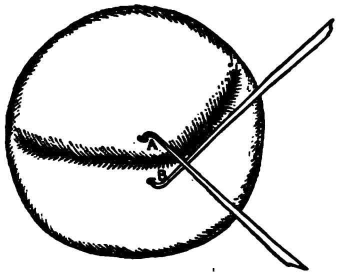


Fig. 442.

Figs. 441 and 442. Testing for the extent of the tear, in cases where the cervix has the appearance of a ball. The center of the anterior lip (A, Fig. 441), and of the posterior lip (B) are each caught with a tenaculum and brought together, as indicated in Fig. 442. (Baldy—*American Text-book of Gynecology.*)

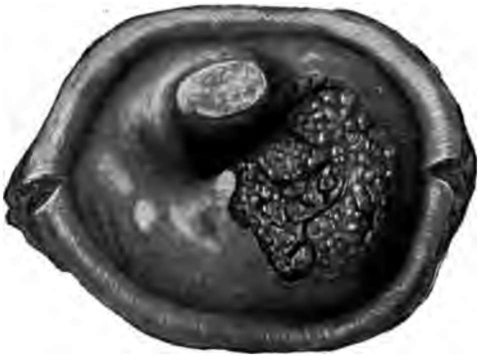


Fig. 443. Beginning Epithelioma of the Cervix. (Sampson—*Johns Hopkins Hospital Bulletin.*)

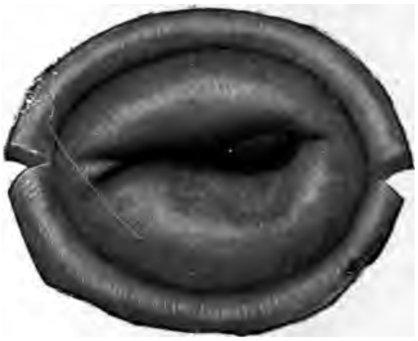


Fig. 444. Beginning Carcinoma of the Interior of the Cervix. (Sampson—*Johns Hopkins Hospital Bulletin.*)

Malignant disease of the cervix causes many thousands of deaths annually and yet in the beginning it is entirely local and, when recognized early, can be completely removed. The diagnosis is considered in detail in chapter IX. Here I wish to simply call attention to the fact that beginning malignant disease may make very little change in the general appearance of the cervix. Any suspicious area should be carefully investigated and, if necessary to a positive diagnosis, a small piece should be excised for microscopic examination. Beginning malignant disease of the cervix is shown in Figs. 443, 444, 445. Fig. 446 shows the cervix destroyed

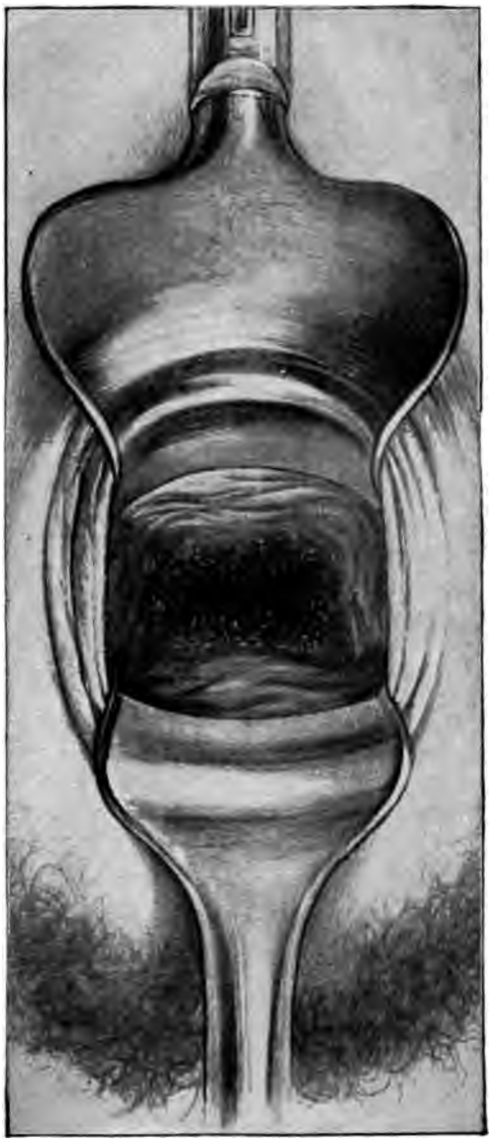


Fig. 445. Epithelioma of the Cervix. The cervix has been destroyed, leaving only an area of cancerous ulceration at the top of the vagina. (Kelly—*Operative Gynecology*.)

and drawn in by contracting tissue, so that no ulceration is visible through the speculum. But in the vaginal palpation in this case distinct induration was felt in the area bounded by the dotted line. Fig. 447 shows a case where the carcinoma has appeared in the form of a papillary growth.

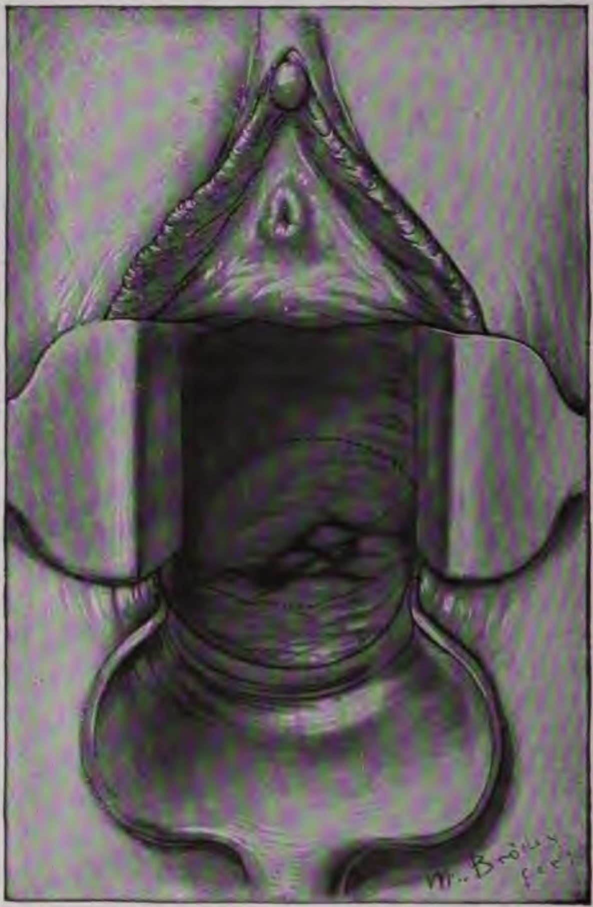


Fig. 446. Epithelioma of the Cervix. The cervix has been destroyed and the affected area has been drawn in, by the gradual contraction of the infiltrated tissues, until no cancerous tissue can be seen. Palpation, however, shows that there is infiltration of the area enclosed within the dotted line. (Kelly—***Operative Gynecology***).

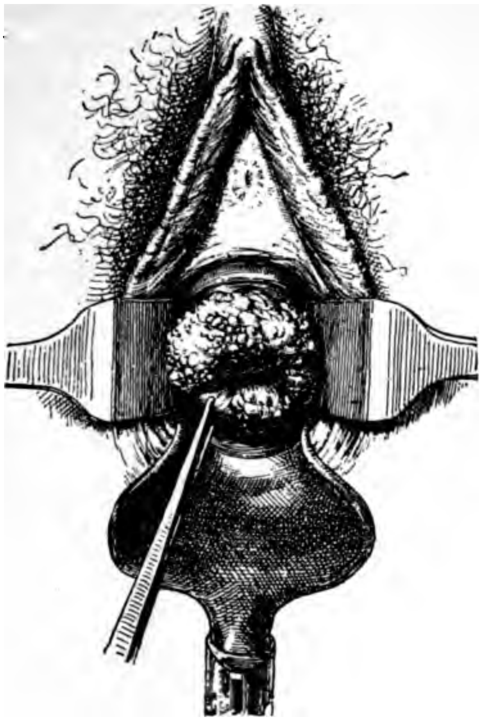


Fig. 447. Epithelioma of the Cervix, appearing as a Papillary Growth. (Kelly—*Operative Gynecology.*)

PAIN IN PELVIS OR LOWER ABDOMEN.

Pain in the pelvis or lower abdomen may be due to:—

1. Salpingitis, acute or chronic. Pain referred to tubo-ovarian region (Fig. 148). History of preceding uterine inflammation, with cause for same. If chronic, history of preceding exacerbations. On abdominal palpation, tenderness in tubo-ovarian region. On vaginal and bimanual examination, there is found vaginal discharge (evidence of preceding uterine inflammation) and marked tendeness in tubal region. Mass is indurated, extending up to uterine horn and out to pelvic wall. Fixation of upper part of uterus and pain on movement of uterus. Absence of special signs of tubal pregnancy or of chronic oophoritis. Mass may be solid (consisting only of exudate or infiltration) or may give more or less fluctuation, due to serous fluid (hydrosalpinx) or to pus (pyosalpinx). All these conditions are included under the term salpingitis.

2. Oophoritis, acute or chronic. Acute or subacute inflammation of the ovary ordinarily presents practically the same diagnostic points as salpingitis, is usually associated with, and over-shadowed by, the general term "pelvic inflammation." There is however, one rather common form of oophoritis not associated with salpingitis, namely, the cystic or cirrhotic form. When not associated with salpingitis or peritoneal exudate, there is felt on bimanual examination, a tender mass in the tubo-ovarian region—rounded, about the size of the ovary or larger, softened, with occasionally a fluctuating area, movable, often lying lower than ovary usually does (prolapse of ovary behind uterus) and when pressed upon produces a peculiar sickening pain. There is absence of peritoneal exudate and there is no fixation.

3. **Pelvic cellulitis.** Signs same as in salpingitis except induration very hard (unless collection of pus) and occupying connective tissue areas, situated lower at side of uterus and intimately connected with uterus or pelvic wall.

4. **Endometritis, acute or chronic.** Pelvic pain slight, sense of weight and pressure in the pelvis. Uterine discharge, excessive menstruation, tenderness of uterus, no induration or marked tenderness outside uterus.

5. **Backward displacement of Uterus.** If uncomplicated, the pelvic pain is slight but there is a sense of pressure and weight. Body of uterus absent in front of cervix. Back of cervix can be felt a mass which, on further investigation, proves to be the body of the uterus.

6. **Fibroid tumor of Uterus.** Unless tumor is very large and chokes pelvis, pelvic pain is slight but there is a sense of weight and pressure. Frequently uterine discharge and excessive menstruation. No history of uterine infection or attacks of pelvic inflammation. Firm mass firmly attached to uterus, not tender, not movable separately from uterus, but uterus and mass movable together in pelvis (i. e., no fixation of uterus and mass to pelvic wall) except when tumor is so large as to fill pelvis. In deep seated fibroids, mass may appear as an enlarged uterus.

7. **Cancer of Uterus.** Leucorrhoea, with occasionally a streak of blood. No pain at first but later, when uterus is much enlarged (cancer of corpus) or infiltration involves parametrium (cancer of cervix), pain appears. If in the cervix, there is indurated area or an ulcer that resists treatment, and a piece should be excised for microscopic examination. If from body of uterus, there is a leucorrhoeal discharge or a blood-streaked discharge that resists treatment, and the interior of the uterus should be curetted and the scrapings examined microscopically. In the later stages there is a bleeding mass, with indurated margins, at site of cervix, or a bloody watery foul-smelling discharge from the interior of the uterus. A bloody foul-smelling watery discharge, does not necessarily mean cancer. It may be due to a fibroid, the differential diagnosis being made by microscopic examination of clippings or curettings, when necessary.

8. **Painful Menstruation (dysmenorrhoea).** Pain due to menstruation alone, occurs only at the menstrual periods, though pain from most any pelvic disease may be much increased at the menstrual period, on account of the menstrual congestion and increased nerve-sensitiveness. The various causes of dysmenorrhoea and the differential diagnosis, are given in chapter XIV.

9. **Pregnancy, with Threatened Miscarriage.** Pains are usually somewhat paroxysmal, missed menses, morning sickness, pains in breasts, beginning softening of cervix, uterine body enlarged and softened, elasticity of middle segment (Hegar's sign), bluish coloration of vaginal walls and cervix.

10. **Incomplete Miscarriage.** History of early pregnancy, pain and passing of blood clots or "pieces of flesh," followed by a bloody discharge and occasional pains. The pains are usually slight (unless infection has taken place),

the principal symptom being the persistent bloody discharge. Cervix and body of uterus softened. Cervix open, and sometimes pieces of membrane and of blood-clost may be felt projecting out of it.

11. Tubal Pregnancy. Missed menses, morning sickness, uterus slightly enlarged and softened, tender mass in tubal region. Diagnosis on these signs not justifiable, unless previous examination of pelvis has shown it free from tubal or ovarian-inflammatory trouble. If rupture takes place, pain and tenderness are so marked and so severe at first as to preclude satisfactory palpation of tubo-ovarian regions. If hemorrhage is severe, pulse is affected. If slight, pain disappears and mass can be made out beside uterus or behind it. The signs at this stage (slight peritoneal hemorrhages and resulting peritoneal irritation and exudate) are the same as for acute salpingitis with exudate, with the following special features:—

a. Bloody vaginal discharge, beginning within a few days after onset of pain and continuing in an irregular way from one to several weeks.

b. Only slight fever or none. With enough acute inflammation to cause such severe symptoms, there should be considerable and persistent fever.

c. Evidence of internal hemorrhage, to a greater or less extent.

d. Exacerbations of pain without apparent cause and without decided elevation of temperature.

e. Absence of recent intra-uterine pregnancy (miscarriage and infection are very common causes of ordinary salpingitis).

12. Pelvic Tuberculosis. Evidences of pelvic inflammation (tenderness, induration or mass beside or behind the uterus or filling pelvis, fixation of uterus, fever and exacerbations), with the special features given for pelvic tuberculosis in chapter XI.

13. Tumor of Ovary, Broad Ligament or Fallopian Tube. A mass (usually soft, fluctuating) in tubo-ovarian region not tender, usually freely movable. Not intimately attached to uterus, no fixation of uterus unless mass is large enough to displace uterus to side of pelvis. Ovarian growths are usually freely movable and tend to rise out of the pelvis, while broad ligament growths are held firmly within the broad ligament and cause pain and uterine displacement while still small.

14. Laceration of the Pelvic Floor. Loss of support in pelvic floor causes more or less dragging and pressure in pelvis (though rarely severe pain), present principally when patient is on her feet, much relieved when she lies down. Feeling of weakness at pelvic outlet, and may be protrusion of parts (colpocele, cystocele, rectocele, prolapse of uterus). Examination shows marked loss of support in pelvic floor.

15. Acute Vaginitis. Pelvic pain slight and very low (more of pressure and weight and burning), free discharge, vulvar and urethral irritation. Examination shows purulent discharge and evidences of acute inflammation of vagina.

There are a number of **extra-genital diseases** that may cause pain in the pelvis and lower abdomen and that may be confounded with gynecological affections, and that consequently must be taken into consideration in differential diagnosis. Among them may be mentioned the following:

16. Appendicitis. Pain more diffused through abdomen and about umbilicus at beginning of attack. Tenderness at McBurney's point, and no particular tenderness over tube. Mass in appendix region, and not in tubo-ovarian region. Attacks

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associated with gastro-intestinal symptoms rather than with uterine symptoms, though pain may be worse at menstrual periods on account of menstrual congestion. Mass may involve both regions—if in virgin probably appendicitis, if in married woman probably salpingitis.

17. Mucous Colitis. Causes severe attacks of pain in lower abdomen and pelvis, and has frequently been mistaken for uterine or tubal or ovarian disease. Patients have been given pelvic treatment for months and years and have even had the ovaries removed when the trouble was none other than this peculiar affection of the colon. The affection is known by various names, such as membranous enteritis, tubular diarrhoea and mucous colic.

Osler states: "It is a remarkable disease, to which attention has been paid for several centuries. It is an affection of the large bowel characterized by the production of a very tenacious, adherent mucous, which may be passed in long strings or as a continuous tubular membrane. I have twice had opportunity of seeing the membrane in situ, closely adherent to the mucosa of the colon, but capable of separation without any lesion of the surface. According to W. A. Edwards, 80 per cent. of the recorded adult cases have been in women. The cases are almost invariably seen in nervous or hysterical women or in men with neurasthenia. All grades of the affection occur, from the passage of a slimy mucous like frog-spawn to large tubular casts a foot or more in length. Microscopically the casts are, as shown by Sir Andrew Clark, not fibrinous but mucoid and even the firmest consist of dense, opaque, transformed mucous. It is due to a derangement of the mucous glands of the colon, the nature of which is quite unknown. The disease persists for years, varying extremely from time to time, and is characterized by paroxysms of pain in the abdomen, tenderness, occasionally tenesmus, and the passage of flakes or long strings of mucous, sometimes of definite casts of the bowel. The attacks last for a day or in some cases for ten days or two weeeks. Mental emotions or worry of any sort seem particularly apt to bring on an attack. Occasionally errors in diet or dyspepsia precedes an outbreak. Membrane is not passed with every paroxysm, even when pains and cramps are severe. There are instances in which the morphia habit has been contracted on account of the pain. There may be marked nervous symptoms, and authors mention hysterical outbreaks, hypochondriasis and melancholia. The diagnosis is rarely doubtful (when this affection is in mind) but it is important not to mistake other substances for membranes, thus the external cuticle of asparagus and undigested portions of meat and sausage skins, sometimes assume forms not unlike mucous casts, but microscopical examination will quickly differentiate them."

This affection may prove confusing when associated with endometritis or other pelvic lesion. The points in the differentiation of mucous colitis from a serious painful pelvic disease, are the character of the pain (resembling intestinal cramps and extending throughout the lower abdomen), the passage of characteristic masses of mucous in some of the attacks and the absence of any palpable pelvic lesion to account for the symptoms.

18. Other Intestinal Affections—digestive disturbance, enteritis, colitis, dysentery, typhoid fever, chronic constipation (with distention and toxemia), intestinal tuberculosis. Each of these may cause pain in the lower abdomen and, if there happens to be accompanying uterine symptoms, may lead to a mistaken diagnosis. Pain is more widespread and variable. Tenderness on palpation is more general and ill-defined, all the lower abdomen being more or less tender and the tenderness may extend above the umbilicus and into the flanks. Uterine and tubo-ovarian region not especially tender. No palpable lesion in pelvis to account for symptoms. Special gastro-intestinal symptoms elicited on questioning.

19. Peritoneal Tuberculosis. This very closely resembles ordinary chronic pelvic inflammation in its symptoms and course. The differential diagnostic points are given in chapter XI.

20. Kidney or Ureteral Affections—movable kidney, nephrolithiasis, pyonephosis, ureteritis, and tuberculosis of kidney or ureter. Each of these affections causes attacks of pain, involving the lower abdomen and pelvis. Pain begins in kidney region and extends downward along ureter to bladder. There may or may not be accompanying bladder disturbance (frequent or painful urination, vesical tenesmus). On examination, tenderness in kidney region is elicited by accurate palpation of kidney and along ureter, and there may be displacement or enlargement of kidney. On bimanual examination, there is tenderness in bladder or along ureter and no palpable lesion of genital organs sufficient to account for symptoms. There are pathological findings in the urine.

21. Bladder or Urethral Inflammation or Tumor. History of bladder symptoms (frequent or painful urination, vesical tenesmus, urinary changes.) On examination, tenderness is confined to urethra, bladder or ureters, there are pathological findings in urine and no palpable lesion of genital organs sufficient to account for the symptoms. If the case is still doubtful, instrumental examination of urethra, bladder or ureters may give decisive information.

22. Rectal and Anal Diseases—proctitis, hemorrhoids, fissure, new growths. History of rectal symptoms (pain on defecation, discharge of mucus and perhaps blood at times, protrusion of hemorrhoidal mass). On examination, tenderness and other abnormalities are found about anus and extending up along course of rectum. No palpable lesion in genital organs to account for symptoms.

23. Nervous Diseases—transverse myelitis, neurasthenia, hysteria, pelvic neuralgia. The history indicates disturbance of the nervous system, there are the special features of one of these nervous affections and there is no palpable lesion of genital organs sufficient to account for the symptoms. Pelvic tenderness is confined to the pelvic nerve strands or to the otherwise apparently normal ovaries. For thorough pelvic examination it may be necessary, in order to overcome muscular tension, to examine under anesthesia.

24. Coccygodynia (painful coccyx). The painful affections of this bone, either following injury or of spontaneous origin, are often mistaken for some genital or rectal affection. The pain is described by the patient as at the very end of spine, and may radiate from there into the pelvis or down the thigh. It is noticed especially in positions that occasion movement of the bone (the act of sitting or rising, or straining at stool, or walking up or down stairs) or that cause pressure on the bone (resting on hard surface, riding on rough road). On examination with the finger in the rectum and the thumb outside on the bone (Fig. 89), there is marked tenderness on palpation of the bone and pain on movement of same. There ay be deformity, indicating previous injury or inflammation. The marked te erness is limited to the region of the coccyx. There is no palpable lesion of t nital organs to account for the symptoms.

BACKACHE.

kache, either in the lumbar region or extending down over the sacrum, ma used by most any of the conditions mentioned under "pain in the pelvis an wer abdomen." It is not necessary to repeat them here.

In addition, backache may be caused by affections of the muscles, nerves, ligaments or joints of this region, or by affections of the bones or spinal cord.

REFLECTED PAINS.

Reflected pains do not occupy as large a place in gynecologic symptomatolog as formerly. We have come to look upon these distant pains in gynecological case as usually an indication of some intercurrent or complicating trouble at the site

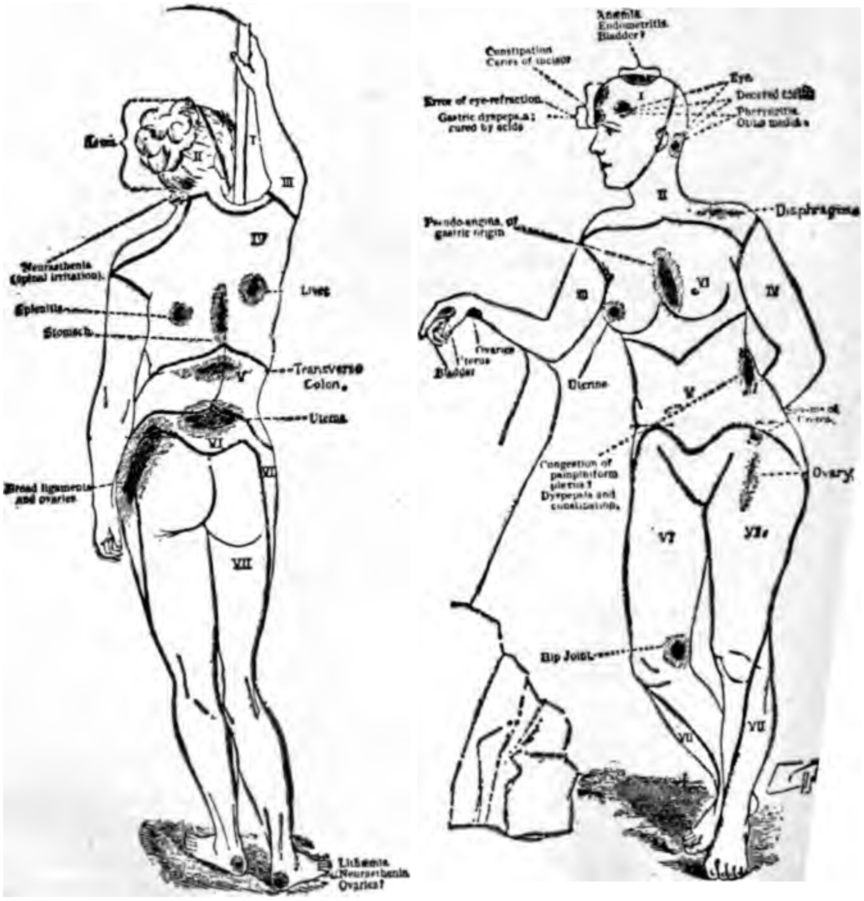

Fig. 448. Showing the usual cause of Reflex Pains in the various regions. (Dana—Text- *Nervous Diseases.)*

the pain or of an abnormal condition of the nervous system, rather than as a direct reflex from the pelvic trouble. I think careful investigation will show this to be the case in the great majority of instances of so-called reflex pains.

In rare cases, however, the connection between the distant pain and the pelvic lesion seems very close, as where, for example, a pain in the head or other situation is made to disappear by correction of a retrodisplacement of the uterus, only to reappear as soon as the uterus returns to its malposition.

When reflected pains do occur they are likely to be found as indicated in Fig. 448.

DISTURBANCES OF FUNCTION.

The various disturbances of function (amenorrhoea, menorrhagia, irregular menstruation, dymenorrhoea, dyspareunia, sterility) constitute important symptoms of disease in certain cases. They are considered in detail in chapter XIV, where the various causes, and consequently the diagnostic significance, of each are given.

CHAPTER III.

GYNECOLOGIC TREATMENT.

In Gynecologic Treatment the following therapeutic measures are employed:—

Rest.

- Complete Rest, in bed.
- Partial Rest, from work.
- Sexual Rest.

Applications to Lower Abdomen and Exterior of Pelvis.

- MOIST HEAT.
  - Hot Stupes.
  - Hot Pastes.
  - Hot Poultices.
  - Hot Sitz-baths.
  - Hot Moist Pelvic Pack.
- DRY HEAT.
  - Hot Water Bag.
  - Japanese Stove.
  - Hot Water Coil.
  - Electrotherm.
  - Hot Air Chamber.
  - Hot Dry Pack.
- COLD APPLICATIONS.
  - Ice Bag.
  - Cold Coil.
  - Cold Sitz-bath.
- COUNTER-IRRITANT APPLICATIONS.
  - Mustard (poultice, plaster).
  - Cantharides (plaster, collodion).
  - Tinct. Iodine.

Applications to External Genitals, Vagina and Cervix.

- Douches.
- Concentrated Solutions.
- Powders.
- Tablets.
- Vaginal Suppositories.
- Tampons.
- Tampon-capsules.

- Pessaries.
- Submucous Injection of Substances.
- Local Blood-letting.
- Curet.
- Cautery.
- Electricity.
- X-Ray.
- Finsen Light.
- Radium.

Intra-Uterine Treatment.

- Medicated Applications within uterus.
- Hot Water Irrigation.
- Curetment.
- Cauterization.
- Electricity.
- Cervical Dilatation.
- Vacuum Treatment

Applications within Rectum.

- Enemata, Low and High.
- Hot Water Irrigation.

Applications to Lower Abdomen and Interior of Pelvis.

- Pelvic Massage.
- Pressure Treatment.
- Electricity.

Applications to Body Generally.

- Bathing.
- Friction Rubbing (with alcohol, salt, brush, etc.)
- General Massage.
- Dress Corrections.

Postural Methods and Exercise.

- Knee-Chest Posture.
- Trendelenburg Posture.
- General Exercise.
- Special Exercise.

Internal Treatment.

- Medicines.
- Diet.
- Psycho-therapy.

Operations.

REST.

Complete rest in bed is necessary when acute inflammation is present and in acute exacerbations of chronic inflammation.

In an acute attack of vaginitis, endometritis, salpingitis or acute pelvic peritonitis, the patient should be put to bed and kept there until the pain and fever subside. When the inflammation is severe and accompanied by much pain, the patient should use the bed-pan and should not be permitted to get up to a vessel beside the bed. Also, rest in bed for a few days will temporarily diminish the pain of chronic inflammation and the backache and distress that accompany loss of support in the pelvic floor.

It is a rule, with but few exceptions, that in pelvic disease strict rest in bed, combined with laxatives and hot vaginal douches and hot applications to lower abdomen,will in twenty-four to forty-eight hours relieve the pain to such an extent that the patient is comfortable.

The exceptions to this rule are:—

Active spreading inflammation of the peritoneum.
A collection of pus with tension.
Recurrent hemorrhage, as in tubal pregnancy.
Threatened abortion.
A tumor compressing pelvic nerves.
Neuritis and neuralgia.

In these conditions the pain may be persistent and severe in spite of absolute rest. By keeping these things in mind, the effect of rest becomes a help in differential diagnosis in certain cases.

Partial rest is advisable in many cases that do not require complete rest in bed. The work of some patients, requiring as it does much walking or long standing or constant running of the sewing machine or lifting of children, tends to aggravate and prolong certain pelvic affections and for that reason it may be necessary to have the patient stop work for a while, even though she can ill afford financially to do so. Again, it may be advisable to direct a vacation to some distant point for the patient who is dragged down by household duties or the care of children or office work or the exactions of society. The rest from care, the change of environment, the direction of the thoughts and activities into new channels, will in some cases do do more than anything else toward restoring the patient to health. Directions should of course be given for whatever additional therapeutic measures are necessary during the visit.

Sexual rest is necessary in many cases, particularly in inflammatory troubles. In some cases coitus must be absolutely forbidden and in other cases restricted, as the marked congestion accompanying it is likely to aggravate the trouble.

In acute inflammation it is rarely necessary to say anything on this point, as the painfulness of coitus itself prevents it. In sub-acute inflammations however and in chronic conditions aggravated by pelvic congestion, when the trouble resists treatment and it seems probable that coitus is interfering with the cure, it is advisable to stop sexual intercourse or restrict it. This may be accomplished by one of three ways, as follows:

a. Instructing the patient or her husband regarding it. This is somewhat embarrassing and not very effective, though it is sometimes the best plan.

b. Use of vaginal tampons, the tampons to be worn continuously and changed only in the office. In this way the beneficial effect of tampons is secured and at the same time coitus is restricted. The tampon-capsules when indicated for other purposes, may be used so as to accomplish this object also—the patient being directed, on removing each tampon, to take a douche and immediately introduce the next one.

c. Sending patient on a trip away from home. Here also the sexual rest is only incidental, though quite important in conditions aggravated by pelvic congestion.

APPLICATIONS TO THE LOWER ABDOMEN AND EXTERIOR OF PELVIS.

These applications are used to relieve pain and limit inflammation.

MOIST HEAT.

Hot stupes are made by folding a piece of flannel several times, making a pad large enough to cover the lower abdomen. This pad is wrung out of very hot water and quickly applied to the abdomen and covered with a piece of thin oilcloth or a heavy towel. The thin oilcloth is preferable, as it keeps in the heat and moisture better and is not so heavy. As soon as the pad begins to cool, another one is wrung from the hot water and slipped in place as the first is removed. If the stupes are changed frequently and thus kept hot, they are very effective in relieving pelvic pain.

They have some effect in all painful conditions, but the most marked effect is seen in the pain of inflammation. The efficiency of the hot stupes may be increased by adding one or two tablespoonfuls of turpentine to the hot water in the basin. To some patients, however, the odor of turpentine is disagreeable and disturbs the stomach and with such it should not be used. The disadvantages of hot stupes are that they have to be changed very frequently and that they soon get the bedclothing damp.

Hot pastes. There is a material for external use, consisting of an earthy silicate for a base and having incorporated glycerine and mild antiseptics with a pleasant odor. This is very convenient for application to the lower abdomen for it holds the heat and moisture well. This material, with slight variations, is put up by a number of firms and given different names (glykaolin, antiphlogistin, etc.). Under one of the trade names, it may be purchased at any drug store in one or two pound cans. The methods of its application is as follows: Take off the lid and set the can in a pan of hot water on the stove until the paste is thoroughly heated. It is then thin enough to spread easily with a spatula or knife or spoon handle. It is spread directly on the skin in a thick layer (about ½ in. thick). The whole lower abdomen is covered with a thick layer of the hot paste, which is covered with a piece o flannel and outside of this is placed the hot-water bag or Japanese stove to keep it warm. The paste sticks tight to the skin at first, but after twenty-four hours usually there has been sufficient perspiration beneath it to loosen it and cause it to come off easily. It is then removed and a fresh layer applied immediately. A fresh application is made every twenty-four hours, as long as hot applications are desired.

Flaxseed Poultice retains the heat well and is much used as a home remedy when hot applications are desired. It is not nearly as convenient nor cleanly as the hot pastes but is about as efficient if changed often and kept up for several days, and is often at hand when the other things are not available. The flaxseed poultice is made as follows: Take two parts of ground flaxseed (flaxseed meal) and five parts of boiling water and mix with constant stirring. When mixed, spread thick (½ in.) on a piece of thin muslin or cheese-cloth. Have the cloth large enough so that you can leave a margin on each side to fold over. The poultice should cover one-half the cloth and the other half can then be laid over after the margins are turned in. If a hot-water bag or Japanese stove is at hand put that over the poultice to keep it hot.

Hot Sitz-bath. The patient sits in a small tub, preferably of special design, containing water enough to cover the hips, genitals and lower abdomen. The water should be as hot as the patient can stand without discomfort (105° to 115°). She should remain in the sitz-bath from twenty to thirty minutes and then be dried and put in bed. It may be repeated daily or several times daily, as found most beneficial. The hot sitz-bath is sedative in effect and relieves very much the pain of pelvic inflammation. In inflammation it should be used only in those cases where the patient may make the necessary movements without detriment. It is useful also in helping the onset of the menses in amenorrhoea or suppressed menses.

Hot Moist Pelvic Pack. Instead of making the hot applications to the lower abdomen only, they may be extended all around the pelvis. The whole pelvis is encased in the hot stupe or compress, and over all a large piece of thin rubber cloth or table oilcloth is placed. A woolen blanket also is wrapped around the patient to keep in the heat and moisture. This may give much relief from the suffering in acute suppression of menses, in acute pelvic inflammation and in severe pelvic neuralgia.

DRY HEAT.

Hot-Water Bag. The hot-water bag produces almost the same effect as the hot stupes, and keeps hot a longer time without change and is much more convenient to manipulate. If the effect of moist heat is desired, a hot stupe may be applied and a hot-water bag placed over it to keep it warm. If no hot-water bag is at hand, a large flat bottle filled with hot water may be used. This should be securely corked and wrapped in a thick flannel cloth. If no suitable bottle is available, a plate, heated and wrapped in a flannel cloth, may be used, or a stove-lid or other article that will retain the heat.

Japanese Stove. This consists of a small flat metal container, about the size of the hand, in which is burned a compressed powder resembling charcoal. This little container may be purchased at the drug-store for a few cents and is very convenient for applying dry heat or for keeping a moist application warm. If it is wished very hot, two or three sticks, instead of one, of the powder may be lighted and dropped in. If one stove is not large enough, two or three may be used.

Hot-Water Coil. This consists of a coil of rubber tubing and a boiler, the former being attached to the latter by tubing in such a way as to cause a constant circulation of hot water through the coil. It is very nice but rather expensive.

Electrotherm. This electric heating-pad is heated by a current through a cord, which is to be attached in the ordinary electric-light socket. This, like the other dry heat appliances, may be used alone for dry heat or over a moist application for moist heat.

Hot-Air Chamber. The apparatus is the same as that for applying hot dry heat to the joints or other parts of the body, the chamber for gynecological cases being made to fit about the pelvis and lower abdomen. The temperature that will be borne varies with individuals and also with the length of time employed. At first a temperature of 120° for twenty minutes will suffice. After a week or so the patient may bear a temperature of 135° to 150° for 45 minutes. The temperature should not be high enough to cause discomfort above a slight tingling of the skin. The air chamber may be heated with electric lights, instead of in the ordinary way. This is a convenient way and one in which the heat is easily regulated.

The effect of the hot air chamber is to cause marked redness of the skin, free perspiration and a hastening of the absorption of chronic pelvic exudates. Cases of chronic pelvic inflammation are the ones suitable for treatment. In several cases, exudates were absorbed in 14 to 20 sittings. No bad after effects were noted. Cooling is allowed to take place gradually and the patient is then dried and lies in bed for an hour. It takes considerable time, about an hour to each patient, but after the apparatus is once started it may be left in the care of an experienced nurse.

Without any special treatment about 90 per cent. or more of pelvic exudates tend to become absorbed, if the patient is kept quiet. This natural process is hastened by laxatives, hot douches and heat to the abdomen. This particular method of applying heat is about the most troublesome and expensive, except in hospitals where the apparatus is kept on hand or in homes where electricity is available. In cases of persistent exudate without evidence of a remaining focus of infection, it is well to give this method a trial.

Hot Dry Pack. Dry heat may be applied all around the pelvis by packing around it hot water bags or hot bottles or other containers for maintaining the heat, the skin being well protected by layers of flannel.

COLD APPLICATIONS.

In some cases cold gives more relief than heat, though the cases in which it will do so cannot be certainly determined without trial. It has been stated that cold gives more relief when the pain is due to active inflammation and the hot applications in other cases. In my experience, that rule does not hold good. On the other hand, in the majority of cases, pelvic pain, inflammatory or otherwise, is relieved more by hot applications than by cold. Consequently my rule is to use hot applications first and, if they fail to give relief, then the cold.

There are several ways of applying cold. To get the best sedative effects it must, like the heat, be maintained continuously, or almost continuously, for several days.

Ice Bag. The ordinary ice bag is a convenient and satisfactory method of applying cold. If no regular ice bag can be secured, the ice may be put in a hot-water bag. The ordinary hot-water bag filled with ice does fairly well as a substitute for an ice bag but it is not as convenient, for the ice has to be broken into very small pieces. If no rubber bag of any kind is at hand, the broken ice may be wrapped in a towel and placed in a piece of table oilcloth, the edges and corners being pinned up so that no water can leak out.

Cold-Water Coil. One end of the coil is attached to a vessel of ice water so that the water runs through it slowly and keeps it cold. The other end conducts the water from the coil to a waste bucket beside the bed. If the hydrant water is cold enough, the tube leading to the coil may be attached to the hydrant.

Cool Sitz-bath. This is used, not as a sedative but as an active stimulant to the pelvic organs. It is taken the same as the hot sitz-baths except that the temperature of the water is 70° to 50°, and the patient does not stay in so long—only five to twenty minutes. It may be given gradually, i. e., the water is tepid at first and gradually cooled to 60° or 50°. In some cases in which amenorrhoea is due to local loss of tone or to imperfect development, the cool sitz-baths may prove more beneficial than the hot. They should, however, be given cautiously and in strong individuals only and should not be continued unless good reaction comes on. As in a cool general bath, the reaction should be encouraged and increased by prompt drying and brisk rubbing.

COUNTER-IRRITANT APPLICATIONS.

Mustard Plaster. A mustard plaster or mustard poultice is applied over the lower abdomen just long enough to produce marked redness of the skin. It should not be left on long enough to blister. This gives a quick and widespread counter-irritation of the skin and assists materially in relieving acute deep-seated pain. The effect is transitory however, and needs to be continued by the ordinary hot applications. If there is smarting of the skin after removal of the mustard, apply a layer of vaseline and a thin cloth under the hot applications. The addition of turpentine to plain hot stupes is a form of counter-irritation, and in some cases assist very much in relieving pain. Of course, this should not be applied to the abdomen in a case where an abdominal operation may be necessary soon.

Cantharides Plaster. Small fly blisters over areas of persistent pain often do much good in cases of chronic pelvic inflammation without marked lesion and in cases of pelvic neuralgia. The blister should be small, from the size of a quarter to that of a dollar, and should be carefully protected from infection until healed.

Cantharides Collodion is very convenient for making the small fly blisters. Paint it over the area which it is desired to blister and repeat after twenty-four hours if no blister has appeared.

Tincture of Iodine. This is painted over the ovarian region of the affected side once or twice daily until the skin becomes tender. Then it is stopped for a few days until the skin-tenderness subsides somewhat, when it is renewed. By varying the application as indicated by its effect on the skin, a constant mild counter-irritation may be kept up for weeks, often with decided diminution of pain.

APPLICATIONS TO EXTERNAL GENITALS, VAGINA AND CERVIX.

VAGINAL DOUCHES.

The vaginal douche is used for four purposes—for simple cleansing, for astringent effect, for antiseptic effect and for the specific effect of hot water.

Cleansing Douche. The simple cleansing douche is used when there is a troublesome increase in the normal muco-epithelial discharge or when there is a muco-purulent discharge without pain or evidence of inflammation or marked relaxation of the tissues.

Plain boiled water comfortably warm (100° to 105°) may be used, but if there is much discharge it is well to put a teaspoonful of ordinary salt or a teaspoonful of sodium bicarbonate to each pint of water, or the carbolic douche may be prescribed (see Formulae). The simple cleansing douche may be taken with the fountain syringe or with the bulb (Davidson) syringe. It may be taken with the patient lying in bed or in a sitting posture over a vessel. In all vaginal douches the point of the syringe nozzle should be so large that it cannot enter the cervical canal. Serious disturbance and even death has followed the accidental injection of the douche solution into the uterus. The point of the nozzle should be three-fourth inches in diameter, with the end closed and the openings at the sides. When it is necessary to use a slender nozzle (as in giving a douche to a virgin) it should be very short.

Vaginal douches should be used only when there is some definite indications for them. In healthy women the constant use of douches or the routine use of them for indefinite periods, is not advisable. They are not required for mere cleanliness, in fact, they interfere in a measure with the normal germicidal vaginal contents, which nature has provided to keep the vagina in a healthy condition and to protect the structures above.

Astringent Douche. The astringent douche is used when the vaginal walls are lax and atonic or in the various erosions and other chronic inflammatory lesions of the cervix and in cases where there is soft bleeding tissue about the cervix or vagina.

As a mild astringent and sedative douche with some antiseptic effect, a solution of aluminum acetate is exceptionally efficient (see Formulae). Dissolve the powder in boiling water, and then allow it to cool sufficienlly for the douche. It is rather difficult to dissolve, that from some manufacturers more so than from others. The aluminum acetate is excellent to use in connection with the hot douche, the last two quarts of the hot irrigating douche being saturated with it.

When a stronger astringent effect is desired, the zinc sulphate and alum douche (see Formulae) or the tannic acid douche (see Formulae) may be used. These strong astringent douches are used principally in cases of soft bleeding tissue in the vagina or in cancer of cervix or vaginal wall. They may be used also with benefit in relaxation of vaginal tissues and in erosions and other chronic inflammatory lesions of the cervix, in cases where it is impracticable to use the hot douche. Care must be taken that the solution does not irritate the vaginal wall. It is well to begin with a weak solution and advance to the stronger as toleration is established.

Astringent douches should be taken with the patient in the horizontal posture, preferably with the hips elevated on the bed-pan, as described in the technique of the long hot douche (Fig 449).

Antiseptic Douche. The antiseptic douche is used in those cases of purulent discharge or muco-purulent discharge in which the admixture of pus is so prominent that an active germicidal effect is important. One of the best of the germicides for making a strongly antiseptic douche is the only standby, hydrarg. bichloride, used in the strength of about 1-5000 or, where a weak antiseptic is desired, 1-10,000. Some state that it is dangerous to use such a strong antiseptic as a vaginal douche on account of the danger of poisoning. This is hardly probable however with the strength mentioned and under precautions. I have prescribed it freely for a number of years and have noticed no untoward results. I am careful not to use it when there is a large raw surface in the vagina or when there is an opening communicating with a large pelvic abscess cavity or when the cervical canal stands open so that the solution might easily pass into the uterus. Absorption from the intact vagina is not probable. In prescribing, it is well to have the concentrated solution colored (see Formulae) so no mistakes will arise, for it is a violent poison.

Another efficient and very satisfactory douche is formol, 1-5,000 to 1-3,000. Formol, as purchased in the drug stores, is a 40 per cent. solution of formaldehyde gas. Formol is a very strong antiseptic and must be used in weak solution or it will cause irritation. Five to ten drops to two quarts of warm water is usually sufficient, though for special conditions the strength may be increased with some patients.

Hot Vaginal Douche. The hot vaginal douche is cleansing and may be made antiseptic or astringent, but its special and distinct effects are the relief of pain, the limitation of inflammation, the hastening of absorption of exudates and the toning up of relaxed tissues. These effects are brought about by the prolonged application of hot water to the vaginal walls and cervix.

To get the best effect, it is essential that particular attention be given to certain details of its administration. These details are usually carried out in an incomplete way, for the importance of their full employment is not at all appreciated by the patient and as a rule only partially by the physician. Hence, ordinarily, the hot douche amounts to little more than a cleansing douche, the specific effect of the heat being almost wholly missed.

This is an important subject for, given properly, the hot douche is one of the most effective non-operative measures used in the treatment of gynecological diseases. Furthermore, it is an inexpensive and simple measure, the necessary articles costing but little, and the douche may be given to the patient by any woman of ordinary intelligence, if definitely instructed. It has also the least possibilities of harm of the various methods of local treatment and is the least disturbing to the anatomy and physiology of the parts. The specific effect of the hot douche was recognised more than forty years ago by that prince of clinical investigators, Dr. T. A. Emmet, and clearly set forth in his splendid work published in 1879, from which I make the following quotation.

"It has been stated that the sympathetic system of nerves presides over nutrition and the organs of generation and that every blood-vessel, to the minutest capillary, is covered by a network of nerve filaments communicating directly with the different ganglia. When nutrition is impaired, there is naturally a want of tone in the blood-vessels. It is only by exciting reflex action through these nerves that the necessary tonicity will be restored.

"We have three agents for exciting this reflex action, viz., electricity, cold and heat.

"Electricity exerts a decided effect during the time of the passage of the current, but the impression is too transitory and the agent is only to be relied upon as a valuable adjuvant.

"Cold is a prompt excitor of reflex action, by which the vessels contract, but on reaction taking place the parts will become more congested than before, with both the arteries and veins distended.

"Heat, unless at a temperature that would destroy the parts, does not act as promptly in causing this contraction as either electricity or cold. In fact, its immediate effect is to cause relaxation and to increase the congestion of the parts, but if its application be prolonged, reaction ensues and contraction takes place. In other words the reaction from heat is contraction. The capillaries are excited to increased action and as they contract from the stimulus of these nerves, the tonic effect extends to the coats of the larger vessels, their calibre in turn becomes lessened and with this approach to healthy action the congestion is diminished. The popular belief is that heat relaxes and increases the congestion of the parts, and such indeed is the case at first. But a hot poultice is never applied with the object of increasing the congestion, but, as any 'old wife' would express it, to draw the 'fire' or inflammation out—in other words it lessens the congestion by stimulating the blood-vessels to contract. That such is the effect, from the continued use of a poultice, is familiar to everyone and is shown by the blanched and shriveled appearance of the tissues after its removal. The hands and arms of a washer-woman become swollen at first, from the increased flow of blood when in hot water, but the fact is quite as familiar that they afterwards become markedly shrivelled.

"To place the hands in cold water will at once cause the skin to shrivel, as the vessels are stimulated to contract, but we are all familiar with the fact that reaction promptly comes on, and a larger quantity of blood returns to the parts than was driven out. The immediate effect of cold, therefore, is contraction, and with re action comes dilatation; but the reverse is true of heat, which causes at first dilatation followed however by contraction.

"With these practical points before us, we resort to the prolonged use of hot water, by vaginal injections, to gradually bring about the required contraction and tone in the pelvic vessels. Whenever inflammation exists we have congestion of the arterial capillaries.........The congestion may be either venous or arterial.

This remedy is not to be considered a 'cure all,' but one of the most valuable adjuvants, under all circumstances, to other means.

"If a vaginal injection has been properly administered, the mucous membrane will be found blanched in appearance, and the usual size of the canal lessened in calibre, as after the use of a strong astringent injection. As the patient lies on the back with her hips elevated, the action of gravity will be brought into play, by which the veins will be rapidly emptied sufficiently to relieve the over-distension. When in this position also, the vagina will become fully distended by the weight of water and kept so, since only the surplus amount can run off into the bed-pan beneath. The hot water will then be in contact with every portion of the mucous membrane under which the capillaries lie. The vessels going to and from the cervix and body of the uterus pass along the sulcus on each side of the vagina, and their branches enclose the vagina in a complete network.........If then we are able to cause the vessels of the vagina to contract, through the stimulus of the hot water, we can directly or indirectly influence a large part of the pelvic circulation. It is most important to appreciate the necessity for elevating the hips, by which plan so large a portion of the venous blood becomes drawn off by gravitation. If the stimulus of the hot water is then applied, so as to cause the vessels to contract still more, we will, for a time at least, have the pelvic circulation reduced almost to a natural condition. In order to allow the condition of contraction to be as prolonged as possible, I generally direct the injection to be given at night, in bed, just as the patient is ready to retire. Thus, by constantly causing these vessels to contract, and by resorting to every other means of lessening the supply of blood in the pelvis, we will succeed eventually in securing a proper vascular tone.

"No plan of treatment could be more rational or appeal more forcibly to the good judgment of everyone. But, unfortunately, from a neglect of details, it is rare that the slightestbenefit is derived from these injections, although so many years have elapsed since the profession has been fully instructed as to their mode of action. For fifteen years at least, I have been experimenting by different methods in the use of hot water, and have had during that time as large a number of cases as would be likely to be at the service of anyone, and I have arrived at the conclusion that it is an impossibility for a patient to give these injections to herself so as to derive their full benefit. Not the slightest advantage is received from them when administered with the patient in the upright position, or, as is the usual method, while seated over a bidet, for, given thus, the water does not dilate the passage but returns along the nozzle of the syringe. I have found that the best method of all is to have the injections given while the patient is placed on her knees and elbows or chest. In this position we have the assistance both of gravity and the pressure of the atmosphere to empty the pelvic veins, while the water is able to act on a much larger surface of the vagina than it is when the patient is in any other position. But this position is a difficult one to assume, since those who are in the greatest need of hot water have not the strength to remain in it long enough to accomplish the purpose, and considerable difficulty is also experienced in keeping the patient dry. This latter difficulty, however, can in a measure be overcome by using a funnel-shaped receptacle, with an india-rubber tube attached to the smaller end, the two sides being indented sufficiently to enable the patient to keep it in place by keeping the thighs together. But for the larger number of cases, the position on the back, with a bed-pan to elevate the hips, will be found the most convenient. Few women are so situated as to be unable to get someone to administer the injection properly, and the inconvenience of soliciting aid is a trifling one considering the benefit to be derived from it, since experience has shown that, unless the details can be carried out fully, the process only involves a waste of time and a tax on the strength of the patient.

"The temperature and quantity of water are to be varied according to circumstances. When treating the early stages of inflammation, it is necessary that the temperature should be elevated rapidly from that of blood heat to 110°, or to as high a degree as can be borne by the patient, and that the injection should be often repeated. For ordinary use, a gallon of water at two or three degrees above blood-heat is generally sufficient, but the temperature must be maintained at the highest point by the addition of hot water from time to time. The hour of bedtime is usually the best in which to seek for the beneficial effects of hot water on the reflex system in allaying the local irritation, for prolonged vaginal injection at a high temperature will often, when given by an experienced hand, act with more promptness than an anodyne in allaying the nervousness and sleeplessness of an hysterical woman. I have frequently known a patient, after being well rubbed and having received an injection, to fall asleep before the nurse had completed the process and to be so overcome with drowsiness as to be but little disturbed on removing the bed-pan.

"In rare instances and from a condition I am unable to explain, cases are met with where a sensation of weight and an uncomfortable feeling are experienced after an injection of water at the usual temperature. In some instances so much disturbance resulted that occasionally I was obliged to abandon its use. But I have long since ascertained that the injection is well borne at a lower temperature, generally about 95°, and that after a week or two the temperature can be gradually increased.

"This 'cooking process,' as it has been facetiously termed, is rendered easier by the use of ivory or some other nonconducting material for the nozzle of the syringe, since the patient suffers more discomfort from the heated metal surface of the ordinary nozzle coming in contact with the outlet of the vagina than from any degree of heat in the water which it is advisable to employ.

"To the injection (generally to the last pint) may be added glycerine, chlorate of potash, chloride of sodium, carbonate of soda, borax, castile soap, sulphate of copper, muriate of ammonia, brewer's yeast, permanganate of potassa, carbolic acid or any other remedy which may seem to be indicated.

"As the patient improves in health, the quantity of water for the injection may be lessened and the temperature gradually lowered and then discontinued. But for some months it would be prudent, for a few days after each period, to resume the injections at a degree or two above blood heat, and to have recourse to them whenever their use should seem indicated to counteract the effect of some imprudence.

"I do not claim to be the first person under whose direction a vagina was ever washed out with warm water, but I do claim to be the first to use the agent in a systematic manner, for the treatment of the diseases of women, and to have done so with a definite purpose."*

Directions for the Hot Vaginal Douche.

In prescribing the hot douche, take pains to give explicit directions on the following points:—

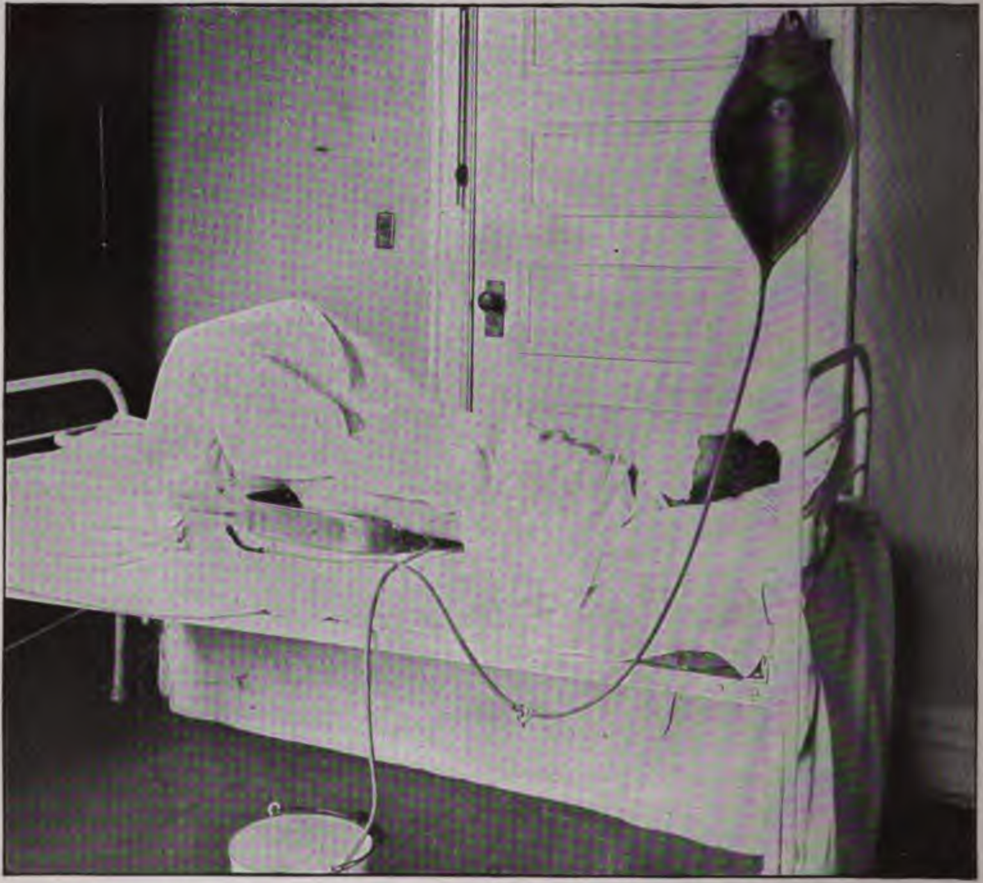

Fig. 449. Patient arranged for the Long Hot Vaginal Douche. Notice that the patient's hips are elevated and that the douche-pan has an outlet tube leading into a bucket beside the bed. The douche-nozzle has a thick end and the openings are at the side, so that there is no possiblity of the water being forced into the uterine cavity. The douche-bag may be hung at any height required to give the desired rate of flow.

1. Articles Required. Direct the patient to buy a yard of thin oilcloth, a douche-pan, a fountain syringe, a bath-thermometer and a four-ounce bottle of lysol.

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* Principles and Practice of Gynecology, by Thomas Addis Emmet, M. D.

The patient wishes the most effective treatment, not half-way measures. These articles cost but little and are necessary to the proper care of the case.

The piece of **oilcloth** is to be placed under the douche pan to thoroughly protect the bed. It does very well. A piece of white rubber cloth is nicer but a little more expensive.

A very convenient form of **douche-pan** is that shown in Fig. 449. It should have an opening for attachment of rubber tubing to conduct the water to a vessel beside the bed, so that when desired, several gallons of water may be used without emptying the douche-pan. This pan holds a good large quantity of water and is easily cleansed, and by closing the outlet with the screw cap it may be used as an ordinary bed-pan. A douche-pan of this or some similar style can be purchased for a small amount and is just as much a necessity in the proper treatment of the case as medicines that cost more.

The fountain syringe should be of good size (3 or 4 qts.), the syringe-nozzle having an end three-fourth inches in diameter and with the openings at the sides (Fig. 449). The nozzle is kept in 2 per cent. lysol solution (two teaspoonfuls to a pint of boiled water) when not in use. Immediately after use each time, it is washed out with a stream of water and then dropped into the antiseptic solution.

The bath-thermometer should register as high as 120F. It is kept wrapped in a clean towel. Each time before use it is cleansed in the lysol solution. After use it is again cleansed in the lysol solution, dried and wrapped in towel.

The antiseptic is used for cleansing the douche-nozzle and the thermometer, and for mixing with the last two quarts of the douche water when it is desirable to do so. Any antiseptic desired may be used. Lysol is easily obtained, may be mixed in approximately the required proportions very easily, does not corrode when mixed in a metal vessel, is of such color and odor that it is not likely to be mistaken for something else and does about as well as anything so far as antiseptic effect is concerned. For a douche use $\frac{1}{2}$ per cent. (one teaspoonful to the quart). If an astringent effect is desired, use alum (two teaspoonfuls to the last two quarts) or aluminum acetate (one teaspoonful to the last two quarts), instead of the lysol. If a still stronger astringent effect is desired, the zinc sulphate douche or the tannic acid douche may be used. The formulae for these various douches are given in the Appendix.

2. Have some one give the douche as follows:—Scald out the douche-bag and tubing with boiling water and hang it about three feet above the level of the bed. Get a tea-kettle of boiling water and a large pitcher of warm water, as warm as the douche may be comfortably begun with (about 105° by the bath-thermometer). Put the piece of thin oilcloth on the bed, and on this an ironing board. Put the douche-pan on the lower part of the board and a quilt on the upper part, to make it comfortable for the patient, and a pillow for her head. If the upper edge of the douche-pan is uncomfortable, cover it with a folded towel. The tube of the douche-pan leads into a bucket beside the bed.

When the patient is arranged, the hips should be considerably higher than the rest of the body (Fig. 437). Take the douche-nozzle out of the lysol solution, rinse off the lysol in the pitcher of douche-water, attach the nozzle to the douche tubing and introduce it into the vagina. Pour some of the warm water from the pitcher into the douche-bag and allow it to run. If some air runs from the douche-tube into the vagina, that is beneficial for it helps to separate the walls. As the patient can take the water warmer and warmer increase the temperature, bringing it up to 115° if not too uncomfortable.

Keep up the hot irrigation, ordinarily, for thirty minutes or more, using as much water as necessary to maintain the irrigation for that length of time. The water runs slowly (only two or three feet elevation) and three or four gallons is usually enough.

3. **If it is desired to make** the latter part of the douche especially **astringent**, as when the parts are relaxed and atonic, a suitable chemical is added. The aluminum acetate is excellent for this purpose, a teaspoonful of the powder being dissolved in the last two quarts of the irrigating fluid. If a strong antiseptic effect is needed, as in a case of purulent discharge, the required antiseptic is added to the last two quarts of the hot water.

In inflammation (subacute or chronic) considerable additional benefit is secured by introducing to the top of the vagina, immediately after the douche, a vaginal capsule containing a tampon with the upper end saturated with some glycerine preparation (ichthyol-glycerine or boro-glycerine). This tampon is left in place from twelve to twenty-four hours, when it is removed and the douche repeated. This is an excellent method of treating subacute or chronic pelvic inflammation and also acute exacerbations of the same.

4. **After the douche,** the patient slides over to another part of the bed while the douche pan, etc., is being removed, and should remain quiet for at least an hour.

5. **The frequency** with which the douche should be repeated varies with the case. In chronic inflammation, when the patient is up and at work and suffering but little, once a day may be sufficient. In such a case the preferable time is in the evening, as the patient is then in bed for several hours afterwards.

In cases of more severity or where the one douche does not produce satisfactory results, a douche in the forenoon may be added—the patient remaining in bed at least one hour afterward.

In the cases where the patient is confined to bed, the douche is given, ordinarily twice daily. In severe cases of acute pelvic inflammation, after it is seen that the uterus is clean and draining and any other focus of infection opened, it may be beneficial to give the hot douche every six hours and in some exceptional cases, it is advisable to keep up an almost constant irrigation of the parts for some days.

6. This hot vaginal douche, with its specific effect, is beneficial in practically **all inflammatory conditions** of the pelvis, in relaxation and want of tone in the pelvic tissues, in pelvic congestion and in pelvic neuralgia. In these conditions it must not be depended on to the exclusion of other necessary measures, operative and non-operative, but it is to be used in conjunction with these, as indicated by the requirements of the particular case.

Where many gynecological cases are treated, it is well to have a printed slip to give each patient who is to take the douche, setting forth definitely, in a few plain words, the necessary directions. By having this to refer to, the person who gives the douche will give it much more nearly as it should be given and therefore much more effectively.

CONCENTRATED SOLUTIONS.

Before taking up the details of the office treatment of gynecological diseases, it would be well to get a clear idea of what **good** can be done and what **harm** can be done by such treatment.

The importance of ordinary office treatment is, on the whole, still rated much above its actual value. This statement applies especially to the application of medicines to the vaginal walls, to the cervix and to the interior of the uterus. In some affections for which this method of treatment is generally and persistently employed, it does no good and much harm.

There is, however, no warrant for those wholesale condemnatory statements made from time to time which, reduced to their essence, mean that when any pelvic disturbance is severe enough to require treatment, it requires operation. Such teaching is very far from the truth and is almost, if not fully, as erroneous in theory and deplorable in results as the former teaching that "local treatment" was the most important measure in the handling of patients with pelvic disease. Happily the treatment of gynecological diseases is no longer based upon obscure theories and opinions empirically expressed, but upon the rational application of known remedies to demonstrated pathological conditions. Though there is still much to be learned and much that is obscure, as there always will be about a subject so intimately connected with the mysterious processes of life, the essential features of most of the diseases and the main effects of the principal methods of treatment are open to the understanding of all who will give the necessary time and study to the subject.

Critically reviewing the demonstrated pathological changes present in the various gynecological affections, it is evident that in a considerable proportion of the serious diseases, effective treatment is necessarily operative, for the abnormal changes are of such nature that they can be influenced only by direct handling and treatment of the affected organs. On the other hand, there are many conditions that may be much influenced by non-operative measures carried out at home, such as attention to general health, internal medicine, special exercises, posture, hot or cold external applications, hot vaginal douches, etc., etc. Much effect is exercised also over certain conditions, by local treatment in the office—pessaries, tampons, packings, pressure treatment, massage, dilatation and various medicinal applications to the vagina or cervix or within the uterus.

No one of these methods should be used until sufficient knowledge has be obtained to show what the principal effects of that method are and in what conditions we may reasonably expect decided benefit from such effects.

The method just now under consideration is the application of concentrated solutions to the cervix uteri, the vaginal wall or the external genitals.

What good can such applications do?

1. They may exercise an antiseptic or an astringent or an anesthetic or an irritating effect, limited to the surface on which they are applied.
2. They may destroy tissue (cautery).

3. They may draw off fluid from tissues adjacent to the vaginal vault (hygroscopic effect), as in the use of glycerine in various combinations. This may diminish the pain (interstitial pressure) of an inflammatory or edematous infiltration and possibly assist nature in limiting the inflammation and hastening absorption. This effect is very desirable, but in acute and subacute cases its beneficial effect is more than overbalanced by the trips to the office. In such cases the effect may be more advantageously secured by having the tampon-capsules used at home, immediately after the douche. Occasionally, in the case of a chronic exudate, when the patient can get about without disturbance, it may be used with decided effect in office work.

4. They may possibly influence deep pains by counter-irritation at the vaginal vault. This is applicable only in cases of chronic exudate or pelvic neuralgia, and even in these it is of doubtful utility. Whether the decided relief of pain that sometimes follows counter-irritation at the vaginal vault is due to the mechanical drawing of the blood from the adjacent tissues to the dilated vessels of the vaginal surface, or to a reflex deep anemia from the irritation of surface nerve-filaments, or to a purely sensory effect on the deeper nerves by irritation of the corresponding superficial nerves, I am not prepared to say. Possibly it is not due to any of these but to some other factor in the treatment (pressure, cleansing, posture).

Formerly much importance was attached to counter-irritation at the vaginal vault, and a woman with pelvic inflammation could hardly be considered initiated into treatment until the vaginal vault and cervix had been painted with Churchill's tincture of iodine. It is not so often used now, for we have more effective measures.

What harm can such applications do?

1. May cause the patient to come to the office when the dressing and coming do more harm than the application does good. This is true of all acute inflammations (even vaginal and vulvar) and of practically all subacute inflammations of the uterus and deep pelvic structures.

2. May cause postponement of effective treatment, by holding out false hope, until the disease is much more difficult of cure or is past cure. This applies to chronic inflammations of the corpus uteri and peritoneal structures, to deep-seated inflammatory troubles of the cervix uteri and to beginning cancer of the uterus.

3. May convert a neurasthenic or hysteric into a confirmed invalid by fixing attention upon, and exaggerating the importance of, some trivial local disturbance. In such patients the frequent calling of the attention to some minor disturbance in any part of the body is deleterious and particularly so if the disturbance is in the genital tract, for the importance of minor disturbances there is greatly overrated in the minds of people generally. For this reason, in patients with neurasthenic or hysteric tendency, I make it a point to avoid repeated local treatments, even in some conditions where otherwise I would feel that they might be beneficial. Occasionally local treatment of an unimportant lesion two or three times, principally for psychic effect and to gain the patient's confidence by letting her see that you appreciate all that is there, is beneficial. Usually, however, the same effect is better accomplished by a thorough examination and then an unequivocal dismissal of those organs from the list of damaged structures.

The concentrated solutions used for application to the vaginal walls or cervix, **are applied** through a speculum by means of a pledget of cotton held with a uterine **dressing** forceps, or by means of a cotton-wrapped applicator. These solutions may **be divided** into several groups, according to effects. I do not give all the solutions **under each** group but only some well known examples.

Solutions Used.

1. Antiseptic and astringent solutions.

Protargol Sol. 2% to 10%.
Argyrol Sol. 20% to 40%.
Silver Nitrate Sol. 2% to 10%.
Bichloride Sol. 1 to 500.
Tinct. Iodine.
Copper Sulphate Sol. 10%.
Adrenalin Chloride Sol. 1-1000.
Liq. Ferri Subsulphatis.

Silver Nitrate solution is the one formerly most commonly used as an antiseptic application to the genital tract. It is still used largely and with excellent effect, though there are some other preparations with the same effect and without the pain on application and the discoloration of the clothing incident to the use of silver nitrate. Silver nitrate is the pioneer of the silver preparations. It is used in the treatment of vulvitis, vaginitis, erosion and ulcer about cervix, endocervicitis and endometritis. The strength used for vulva and vagina is usually 2 per cent. to 4 per cent., the weaker being used at first when the parts are particularly sensitive and the stronger later as the sensitiveness becomes less. A sensitive inflamed surface or an abrasion or ulcer is usually much diminished in sensitiveness after one or two applications, and the application seems also to stimulate repair. For application to an eroded area or an ulcer on the cervix, 4 per cent. to 10 per cent. is used to stimulate repair.

During the last few years a number of silver preparations have been put forward as superior to silver nitrate for local application. Protargol and Argyrol are two that have stood the test of extensive use. They have about the same or perhaps a better effect than silver nitrate, do not irritate so much and do not form permanent stains on the clothing and skin. The protargol is used in the same strength as silver nitrate. The argyrol must be used much stronger, 20 per cent. to 40 per cent. It is the least irritating of the silver preparations.

The bichloride solution is strongly antiseptic and mildly astringent.

Tincture of iodine (either the ordinary tincture or Churchill's tincture) is a useful antiseptic and stimulant to chronically inflamed areas or to erosions or ulcers. It was formerly much used as a counter-irritant application to the vaginal vault in chronic pelvic inflammation, but more effective measures for the treatment of this disease are now available.

The copper sulphate solution is used to check bleeding and to stimulate healthy cell action in eroded and ulcerated areas. It has a tendency to check bleeding from all ulcers except those due to beginning malignant disease. Consequently it is helpful in the differential diagnosis of a malignant ulcer, as explained in chapter IX.

Liq. Ferri Subsulphatis may be used when a strong hemostatic application is needed for a bleeding area.

Adrenalin affects different parts of the mucosa of the genital tract in a different manner. It seems, in some cases at least, to have no effect on the mucosa of the vagina, but a pronounced effect on that of the uterus.

2. Cauterizing Solutions.

Carbolic Acid 95%.
Iodized Phenol.
Nitric Acid—C. P.

Carbolic acid is employed as a cauterant application to unhealthy ulcers on the cervix or vaginal wall, particularly chancroidal ulcers.

Iodized-phenol (see Formulae) is a milder cauterant, more superficial and less irritating than carbolic acid and also less effective. Nitric acid is a very deep and painful cauterant. It is now seldom used, as carbolic acid is effective and is easier handled and causes less subsequent disturbance.

3. Hygroscopic Solutions.

Glycerine.
Boro-glycerine (Boric acid 50%).
Carbol-glycerine (Carbolic acid 2%).
Ichthyol-glycerine (Ichthyol 10%).
Protargol-glycerine (Protargol 10%).
Tannic-acid-glycerine (Tannic acid 10%).

The glycerine preparations are used for the hygroscopic (water-extracting) effect of the glycerine and also for the special effect of the particular drug incorporated with the glycerine. The application is made by soaking one end of a tampon in the desired glycerine preparation and then introducing it through the speculum into the upper part of the vagina, the medicated end being placed against the cervix. These glycerine tampons are used particularly in acute and chronic inflammatory conditions in the pelvis. They seem to assist materially in diminishing the pain and soreness and they certainly exercise a decided effect on the adjacent tissue fluids, for the patients often remark on the large amount of water which comes from the vagina when using these glycerine tampons.

4. Anesthetic Solutions.

Cocaine Sol. 10%.
Cocaine Sol. ½% (for hypodermic injection).
Eucaine Sol.
Chloretone Sol.

The 10 per cent. cocaine solution is used for local application to painful sores or abrasions, to diminish pain during examination or cauterization.

The $\frac{1}{2}$ per cent. cocaine solution is used as a subcutaneous or submucous injection, for removing small growths or pieces of tissue for microscopic examination.

POWDERS.

Powders may be applied by means of the powder blower or they may be placed on a cotton or gauze tampon, which is then placed in the upper part of the vagina Powders innumerable have been used for this purpose, and as a rule any powder that is a good antiseptic application for wounds is good also as a vaginal application.

Powders are used principally for the antiseptic and drying effect or for an anesthetic effect.

1. Antiseptic and Drying.

Pulv. Boric Acid.
Xeroform and Boric Acid (1 to 4).
Bismuth Subnitrate.
Bolus Alba.
Aristol.

Pulverized boric acid is used as a mild antiseptic and drying powder. It is bland and can hardly cause irritation even with children. Xeroform and boric acid (1 to 4) is preferable when a stronger antiseptic powder is desired, in fact, it is the powder I ordinarily use, except when some special astringent or anesthetic effect is desired. Xeroform has proven a very satisfactory substitute for iodoform. Its action in stimulating healthy granulation, is very much like iodoform and it has practically no odor. It is I think just as effective, if not more so, than the other iodoform substitutes and less expensive.

Bolus Alba (the ordinary yeast germs dried) has been highly recommended as a vaginal application in cases of leucorrhoea, with the idea that the yeast fungi inhibit the growth of other bacteria. Gonorrhoeal infections are probably favorably influenced by this powder. Ceriviscine, a special preparation of the dried yeast plant, has been put upon the American market and numerous favorable results have been reported.

2. Anesthetic powders.

Orthoform, Xeroform and Boric Acid (1-1-4).
Chloretone, Xeroform and Boric Acid (1-1-4).

Orthoform is a powder that is decidedly anesthetic and for that reason is advantageously combined with powders used in the treatment of painful affections of external genitals, vagina and cervix. The anesthetic effect is, of course, most marked when the powder is used pure, but, like cocaine, it has a devitalizing effect on poorly nourished tissues and may cause superficial sloughing if used too strong. I have had such an experience with it in treating superficial abrasions due to senlie pruritis vulvae—the orthoform, when dusted on pure, causing the abrasions to become very extensive instead of smaller. A similar experience, in a patient past the menopause, was related to me by one of my colleagues.

Chloretone can be used to advantage whenever there is pruritis or a sense of soreness in the vagina or about the external genitals. It is very satisfactory as a dusting powder to painful ulcers, chancroidal and otherwise. As a dusting powder, it is diluted with a bland powder and combined with an antiseptic powder as above indicated.

TABLETS.

Compressed tablets containing antiseptic or astringent or anesthetic drugs, are put up for vaginal use. They may be introduced to the upper part of the vagina by the patient, either following a douche or without a douche, once or twice daily or more often as directed by the physician.

Tablets of various formulae for vaginal use may be obtained. Several of them are given in the Appendix. They are very convenient in cases where it is desirable to have the patient use some drug between the office treatments or where the patient can not come to the physician or be seen by him often enough for regular treatment. They are not as effective, however, as powder applications made with speculum exposure of the affected area and held in place by a tampon, as in office treatment. In prescribing tablets use only those put up by a reliable house, so that you can depend on the stated formula and know just what you are using.

The effect of these tablets, dissolved in the vagina, as of other vaginal medication, is of course only local (limited to superficial effect on the vagina and cervix) and has practically no influence on deep-seated or serious vaginal or uterine or periuterine lesions. Tablets of various shapes and alleged formulae and called by fancy names, are put up for vaginal use by patent medicine venders and peddled from house to house by women agents. They are put forth as wonderful discoveries that will cure all "female diseases," and like other alleged "wonderful discoveries" they deceive many a poor woman with unfounded hopes, the falseness of which in serious diseases she often discovers only when the disease is past cure. It is another case of "blind leading the blind" or, worse still, of avarice leading the blind.

VAGINAL SUPPOSITORIES AND CONES,

Vaginal suppositories furnish another method of applying medicine to the vaginal wall and cervix.

In vaginal suppositories, the active ingredient is incorporated with coca butter or other suitable material which melts in the vagina. Vaginal suppositories are used principally in the treatment of chronic vaginitis in children, in cases in which it is difficult or impracticable to employ the ordinary and more effective methods of vaginal treatment. Formulae of vaginal suppo are given in the Appendix.

TAMPONS.

A vaginal tampon is simply a piece of absorbent cotton or common cotton or wool or gauze, of the desired size and shape, with a short string attached, so that the tampon may be removed from the vagina by the patient after a specified time.

One way to make a cotton tampon is to take a rather thick piece of cotton (common cotton or absorbent cotton) of the required length and width and thickness and tie one end of a strong string firmly about the middle. Fold the cotton at the place where the string is tied. This brings the free ends together. If it is desired to use a solution, the free ends are dipped in it. If it is desired to use powder, the free ends are spread out so as to make a depression in which the powder is placed. This end of the tampon is then caught with the long uterine dressing forceps and carried up to the cervix. Leave the string long enough so that the end will project from the vagina, that the patient may easily catch it and remove the tampon at the end of twelve to twenty-four hours as directed. It is well to make the string into a loop, as indicated in Fig. 450. Tampons made of surgical wool are preferable when the principal effect desired is support, as they are much more elastic than the cotton and retain their elasticity longer. In some cases the wool proves to be irritating to the vaginal walls. To prevent this and yet secure the springyness imparted by the wool, the wool tampon may be covered with a thin layer of common cotton.

It is a good plan to keep prepared, ready for use, a number of tampons of different sizes. They may be prepared during leisure and they are then ready when needed, and thus is saved considerable time and inconvenience.

When the vagina is tamponed with a strip of gauze or with cotton balls without strings, it is referred to as a vaginal tamponade. I have included all these packings under the general term "tampons."

Tampons of cotton or wool or gauze or vaginal packings of the same, are **used for the following purposes.**

1. To secure the effect of drugs incorporated in the gauze or cotton or held in place by them.
2. To occlude the vagina after operations in its upper part.
3. To stop hemorrhage.
4. To keep inflamed surfaces separated.
5. To support the pelvic organs.

Tampons are much used for **holding medicine** against the cervix and vaginal vault. If the medicine is in solution, for example, one of the glycerine preparations, the end of the tampon is dipped into the solution and then applied to the vaginal vault and left there, to be removed by the patient after twelve to twenty-four hours. If the medicine is a powder, it is dusted freely about the cervix and some of it is placed on the end of the tampon, which is introduced as before.

When used to occlude the vagina after an operation, the gauze or cotton is simply
dressing, the same as when applied to an external wound. The gauze
be simply sterile or it may be impregnated with some antiseptic, as
use, iodoform gauze, etc.

When gauze or cotton is used to **check hemorrhage** it should first be wet in some antiseptic solution and then squeezed as dry as possible before being packed into the vagina. Used in this way it makes a much more effective hemostatic than when used perfectly dry.

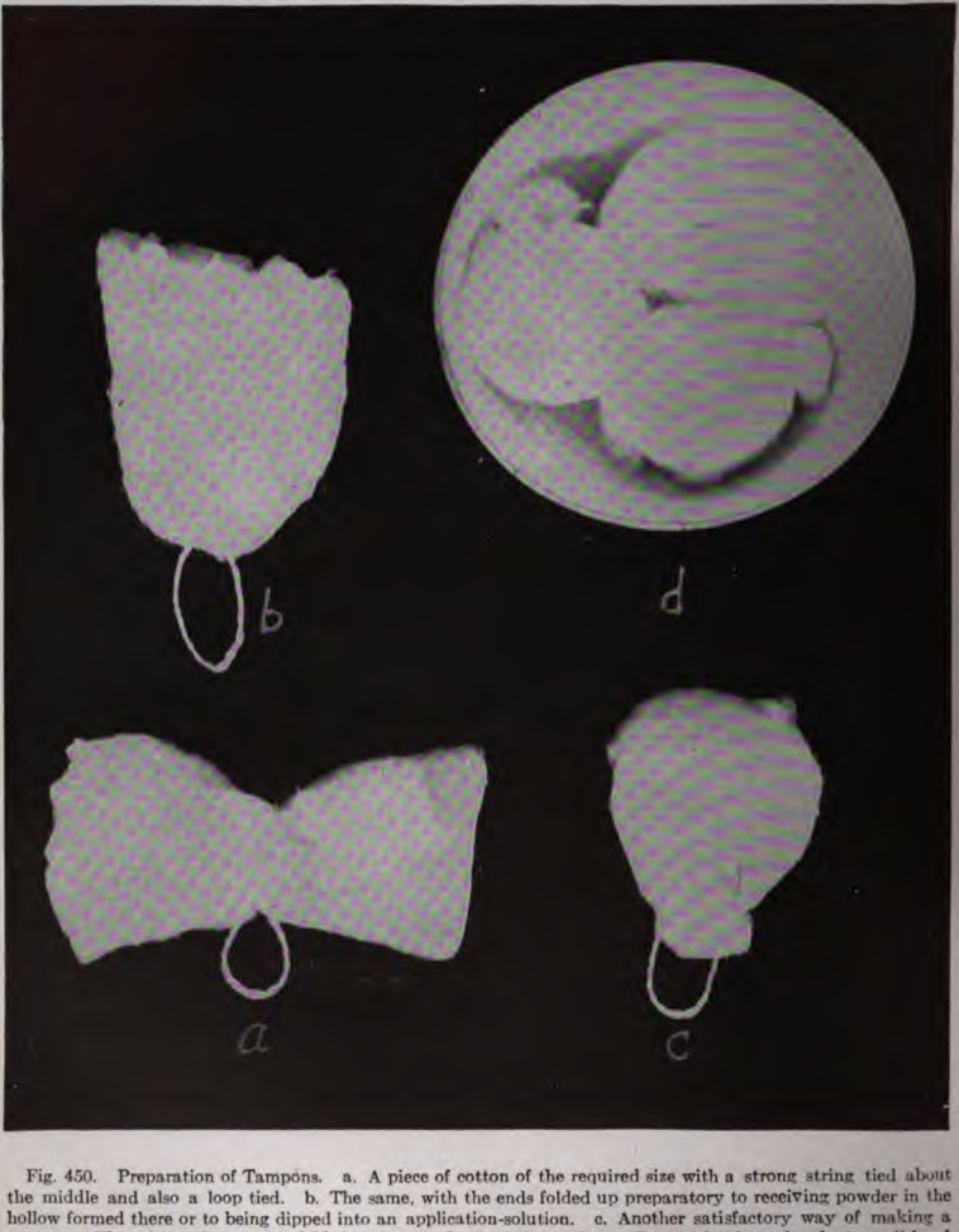

Fig. 450. Preparation of Tampons. a. A piece of cotton of the required size with a strong string tied about the middle and also a loop tied. b. The same, with the ends folded up preparatory to receiving powder in the hollow formed there or to being dipped into an application-solution. c. Another satisfactory way of making a tampon. The piece of cotton is folded and the ends are tied together and the string looped. d. A small bowl containing tampons ready for use.

For keeping inflamed surfaces separated, tampons of cotton or gauze-strips are used in the various forms of vaginitis.

To support the uterus or hold it in position, dry gauze or cotton or wool is used. Wool has more "spring" in it than cotton or gauze, consequently a wool tampon is the best in cases where only support is required. Sometimes the wool tampon irritates the vagina, in which case it may be covered with a thin layer of cotton as before mentioned. When cotton is used for supporting tampons, ordinary cotton is better than absorbent cotton, as the latter absorbs fluids rapidly and soon loses its elasticity. A tampon or tamponade for support should be put in with the patient in the Sims posture or in the knee-chest posture.

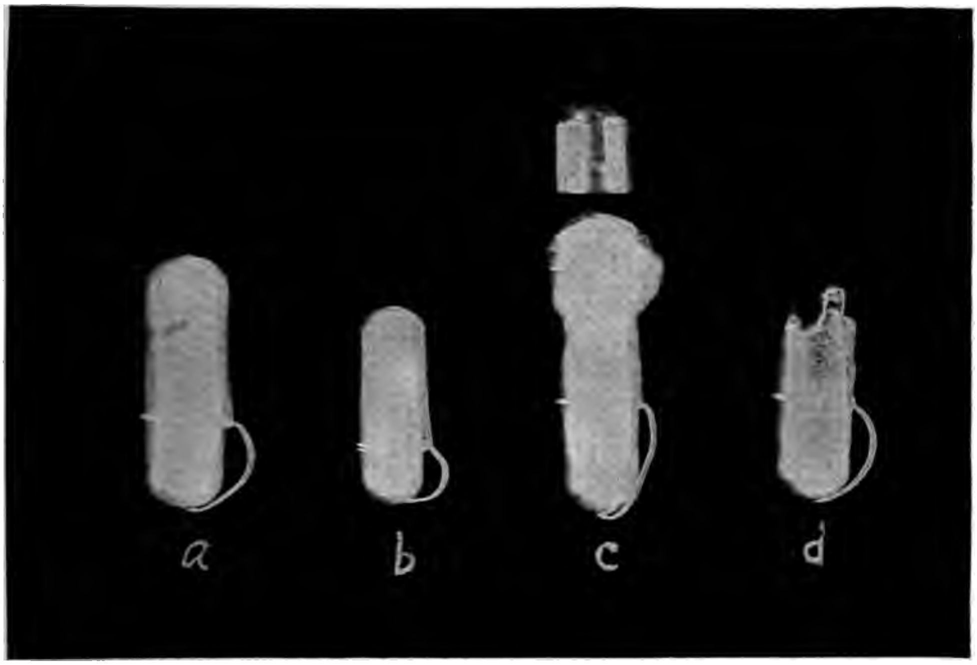

Fig. 451. Tampon-Capsules. a. Large size. b. Small size. c. The cap removed, showing the tampon. d. A tampon-capsule prepared, ready for introduction. The cap was removed and the medicine poured into the cap, which was then replaced. The dark ichthyol mixture shows through the transparent cap.

TAMPON-CAPSULES.

Ordinarily, all tampons are introduced by the physician. When, however, it is advisable that tampons be applied at home by the patient, between the office visits or in conditions in which the patient can not well come to the office, the tampon-capsule may be used. The tampon-capsule is a large capsule of special design containing a plain wool tampon with a string attached. There are two sizes (Fig. 451). They come in boxes of a dozen and may be purchased from the druggist or wholesale drug-houses. They are convenient for use immediately after the hot douche, to secure hygroscopic effect. Just before use, the patient removes the cap from the capsule, pours in about a half a teaspoonful of any desired medicine (usually boro-glycerine or ichthyol-glycerine), replaces the cap and introduces the capsule, medicated end first, up to the vaginal vault. Here the capsule soon melts, liberating the medicine and tampon, and the latter holds the former in place.

PESSARIES.

Pessaries are appliances for introduction into the vagina for the purpose of holding the uterus or vaginal wall in proper position. They are made of hard rubber or soft rubber, usually the former. Those made of soft rubber are generally hollow and contain air or flexible wire. Occasionally a pessary is made of glass or block-tin or some other material.

Pessaries are used principally for the following affections.

For Backward Displacement of the Uterus.
For Prolapse of the Uterus.
For Prolapse of the Anterior or Posterior Vaginal Wall.

For Backward Displacement of Uterus.

In retrodisplacement of the uterus the pessary is used after replacement, to hold the uterus in proper position. Occasionally a pessary is used to support the uterus somewhat when complete replacement is not practicable.

Varieties Used.

nnumerable forms have been recommended, and to attempt to mention all of them would be a waste of time. The following four varieties are the principal ones used at present in the treatment of retrodisplacement, and they are sufficient in practically all cases in which a pessary is the preferable method of treatment.

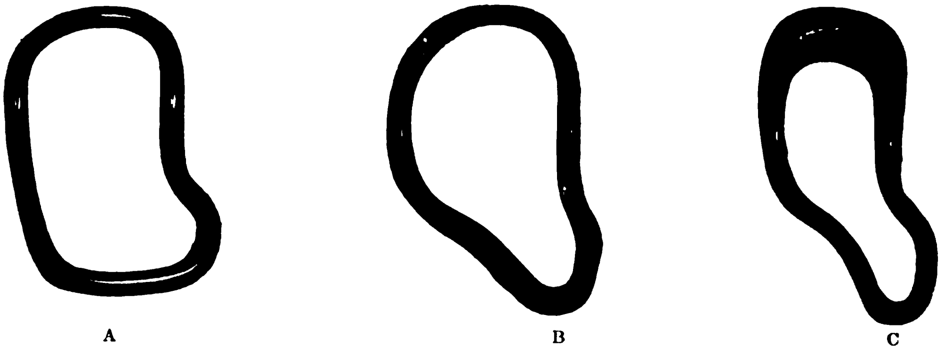

Fig. 452. A. The Hodge Pessary. B. The Albert Smith Pessary. C. The Thomas Pessary.

1. Hodge Pessary (Fig. 452, A). This pessary, devised by Hugh L. Hodge, Professor of Diseases of Women in the University of Pennsylvania from 1835 to 1863, may be taken as the type of the hard-rubber ring pessaries. It is the original model from which nearly all other pessaries of that character descended. It is still much used and, as explained later, is the most suitable one for certain conditions.

2. **Albert Smith Pessary** (Fig. 452, B). Albert H. Smith modified the Hodge Pessary in two important particulars. He narrowed the anterior end so that it fits well up into the narrow portion of the pubic arch, the point projecting slightly into the arch. This tends to keep the pessary from turning or slipping about in the vagina and at the same time causes the anterior part of the pessary to lie higher—so that it is out of the way and does not interfere with coitus or with the introduction of a douche-nozzle. His other modification was a lengthening of the posterior arm of the pessary. This pushes the posterior vaginal fornix further upward and backward, thus increasing the ability of the pessary to hold the cervix uteri well back in the pelvis.

3. **Thomas Pessary** (Fig. 452, C), sometimes called the Smith-Thomas pessary. T. Gaillard Thomas modified the Smith pessary (which was itself a modification of the Hodge pessary) by thickening the posterior end into a bulbous enlargement. This distributes the pressure over a larger surface of the posterior fornix, and in that way tends to prevent pressure injury of the vaginal vault at that point.

4. **Inflated Ring Pessary,** to be described later.

Action of the Pessary.

The action of the Hodge pessary and its modifications, as ordinarily used in a case of retrodisplacement, is to **hold the cervix back** in the hollow of the sacrum. As long as the cervix is held well back in the pelvis, the fundus uteri will stay forward where it belongs. The pessary holds the cervix uteri back in place by holding back the posterior vaginal vault (to which the cervix is closely attached) and also by pushing upward and backward on the sacro-uterine ligaments, thus putting them on the stretch. To accomplish this, the anterior portion of the pessary must have a rather firm support, which it gets from the pubic arch (with intervening soft tissues) and the pelvic floor.

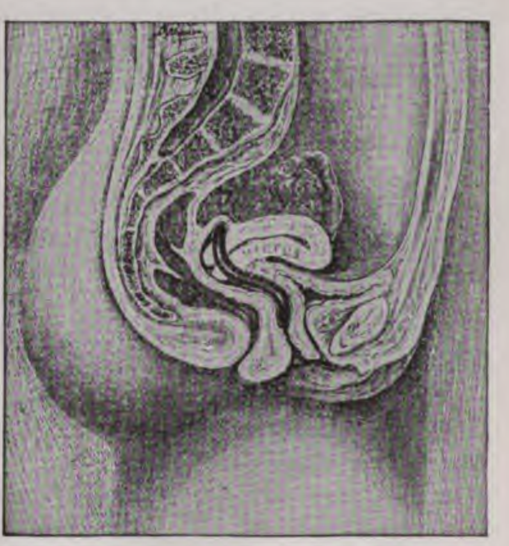

Fig. 453. The Pessary in Place. The action of the pessary is to hold the posterior vaginal fornix, and with it the attached cervix, well backward and upward in the pelvis. (Skene—*Diseases of Women.*)

The action of the pessary, with its many curves, seems to be a veritable puzzle to many students and to not a few practitioners, yet it is clear enough when properly approached and studied. In order to make the matter clear to my classes in a short explanation, I am accustomed to approach the subject synthetically so to speak, i. e., to gradually build up in mind such a pessary. We know that after a movable retrodisplaced uterus has been replaced, if we keep the cervix well back in the pelvic cavity, that is, a certain distance from the vaginal outlet, the fundus will stay forward (Fig. 453). Suppose then that we introduce a straight stick that reaches from the public arch to the posterior vaginal vault. Now as long as the anterior end of the stick is supported by the pubic arch, neither the posterior vaginal fornix nor the cervix, which is closely attached to it, can approach the vaginal outlet. The cervix can move up and down through a small arc, but it can not come any nearer the vaginal outlet and consequently as the cervix is held well back in the pelvis the fundus uteri stays forward.

This is practically the action of the pessary. It takes its fixed **point of support** from the **pubic arch** (the soft tissues intervening), being held up against the narrow part of the arch by the **pelvic floor.** As long as the anterior end of the pessary is properly supported (held stationary) the posterior end holds the posterior vaginal vault and the attached cervix well back in the pelvis. The ring shape of the pessary and the various curves are simply to adjust it comfortably to the adjacent structures. The open ring permits the pessary to lie up well out of the way in the lateral angles of the vaginal canal and also permits the cervix to project through the pessary and the uterine secretions to flow outward without hindrance. The marked upward bend of the posterior portion of the pessary increases its ability to push the posterior vaginal fornix upward and backward and put the sacro-uterine ligaments on the stretch. The long upward curve of the front part of the pessary with the narrow anterior end permits the anterior end to lie up out of the way in the narrow part of the arch, and also furnishes a slope against which the perineum and front part of the pelvic floor acts advantageously, helping to support the pessary in both an upward and backward direction and thus taking some of the pressure off the extreme anterior end. If all the pressure on the pessary were transmitted to the very end, it would cause pain by pinching the soft tissues between the pessary and the bony arch. With the long steep upward curve, however, a large part of the downward and forward pressure is borne by the pelvic floor. The little transverse notch or downward dip at the anterior end of the pessary is to prevent pressure on the urethra as the pessary lies well up in the angle of the pubic arch.

The two principal factors in the support of such a pessary are the pubic arch and the pelvic floor. As to just which furnishes the most support, it is hard to say—probably there is much variation in different cases, depending on the conformation of the parts and the shape of the pessary.

When the pelvic floor is severely torn it permits the pessary to sink lower in the pelvis. The anterior narrow end lies at a wide part of the arch, a part too wide to furnish support for it and it slips outside a short distance. This permits the cervix to come forward and then the fundus goes backward. Now in such a case, if we use a pessary with a wider anterior end (e. g., the regular Hodge pessary) it, being wider, impinges on the sides of the arch and holds the cervix back where it belongs. In very severe laceration, the marked relaxation of the pelvic floor allows the pessary to come so low—to such a very wide part of the arch—that not even the Hodge pessary will stay in. In such a case some temporary relief may be given by other styles of pessary to be mentioned later.

Selection of Pessary.

The selection of the pessary best adapted to a particular case concerns the style, size and special modifications.

As to **style** or form, in retrodisplacement I prefer the Thomas pessary in all but exceptional cases. The advantages of this form are:—

a. Narrow anterior end that lies well up out of the way. There is little or no interference with coitus or with the introduction of the douche-nozzle.

b. Long steep anterior slope on which the pelvic floor can act to advantage in assisting in the support of the pessary.

c. Long posterior arm, which tends to keep the posterior vaginal fornix well up.

d. Thick posterior end, which distributes the pressure over a wide surface of the posterior vaginal fornix and thus prevents injurious pressure or ulceration at any point.

The exceptional cases in which the Thomas pessary is not satisfactory, are as follows:—

1. Where there is a severe laceration of the pelvic floor. In these cases a pessary with a wider anterior end is required, as previously explained. Here the regular Hodge pessary is usually the preferable one. In lacerations of extreme severity, where the parts are so relaxed that neither the Hodge or Smith or Thomas pessary will stay in, the inflated ring pessary or one of the other forms mentioned under prolapse mav give some temporary relief. For permanent relief in such a case operative measures are required.

2. Where the posterior vaginal fornix is too small or shallow to accommodate the large bulbous end. In such a case the Smith or the Hodge pessary may be used. In each of these the posterior bar is of small diameter and will fit into a small posterior fornix. If the pelvic floor is not too badly torn the Smith pessary is the preferable one of the two, as it has the narrow anterior end and the long posterior arm.

3. When there are painful inflammatory lesions about the uterus or a prolapsed and tender ovary. In some of these cases the pessary may be worn without discomfort after the parts have been held in place by tampons for a few days. In others, the tenderness persists and any form of pessary which pushes well up behind the cervix causes pain and hence can not be worn. In such cases the inflated ring pessary sometimes gives considerable relief by diminishing the dragging of the heavy uterus on the inflamed adnexa and broad ligaments. As a rule, however, in such cases time spent with pessaries is time wasted, as far as any permanent relief is concerned.

As to the **size** of pessary to be selected, the approximate length may be determined by measuring with the examining fingers the distance from the posterior vaginal vault (pushed well up) to the pubic arch. The length of the pessary should be a trifle less than this. The width of pessary which the vagina will accommodate may be determined approximately by the apparent roominess of the vagina as felt on vaginal palpation. A special maneuver for this purpose is to introduce the two examining fingers to the upper part of the vagina, separate them laterally as far as the vaginal walls will permit and then withdraw them in the antero-posterior diameter (the largest diameter of the vaginal outlet), retaining them as nearly as possible in the original position.

However, the size of pessary that will keep the uterus in position with the least discomfort can be determined certainly only by trial, and several pessaries may have to be worn for a short time before the most satisfactory one for that particular case is settled upon. A pessary that is too small, fails to hold the uterus in position and tends to slip out. A pessary that is too large, causes pain. It is better to give too small than too large a pessary, as the latter may cause severe pain after it has been in place a day or two, and if the patient is a long way from the physician and cannot succeed in removing the pessary herself, she may experience much suffering.

The **special modifications** refer to slight changes in shape from the regular form, occasionally required to make the pessary more comfortable or more satisfactory in retaining the uterus in position.

1. General Narrowing of the pessary. The pessaries as purchased maintain a ratio between the width and the length (the longer the pessary the wider it is). As a rule this is desirable. In some cases, however, the vaginal opening is too small to admit a pessary of sufficient length. To overcome this difficulty drop the pessary in hot water for a moment, until it becomes slightly pliable, then remove it with a forceps, grasp it with a towel and squeeze it so as to narrow it laterally to the required extent, and hold it thus until it cools. The cooling may be hastened by holding it in cold water. Do not keep it very long in the hot water or it will become so pliable that it flattens into a simple ring, and all the characteristic curves are lost.

2. Local Bending. Occasionally it is desired to bend a hard-rubber pessary at some particular point, so as to change an ordinary curve to an unusual one or to change one form of pessary to resemble another form, which is needed but is not on hand. To make these local bendings, coat that part of the pessary to be bent liberally with vaseline or other ointment and hold it high above the flame of an alcohol lamp or Bunsen burner. Hold it close enough to the flame to heat the pessary well at the exact area it is desired to bend but not close enough to burn off the ointment. In a few moments the pessary is softened sufficiently to permit bending. If the pessary is brought too close to the flame, it is burned and the smooth surface roughened.

In 1859, J. Marion Sims introduced the block-tin modification of the Hodge pessary, the advantage of this material being that it is sufficiently pliable to be moulded to any shape and yet firm enough to hold the shape given it. The block-tin pessary was the favorite with Dr. T. A. Emmet and was highly recommended by him, but it is not so frequently used at the present time. Ordinarily the hard-rubber pessary is preferable.

Pessary Used Only After Replacement.

The pessary is ordinarily not used until the uterus has been brought forward. The pessary is not, as many suppose, used to push the fundus uteri forward, neither is it used to prop the fundus forward. **The pessary has nothing to do** directly with this part of the uterus. All the pessary does is to hold the cervix well back in the pelvis, as previously explained, and then in the ordinary state of affairs the fundus must stay forward.

There are some exceptions to the rule that a pessary is used only after replacement. In some cases of roomy pelvis, in which it is difficult to raise a movable fundus uteri because it gets out of reach, a pessary may be used somewhat as an extension to the finger, to help raise the fundus within reach of the abdominal fingers. Hodge, in describing the use of his pessary, mentions it as a lever for replacing the uterus. He directs that the pessary be introduced and then by depressing the anterior end, the posterior end is thrown upward carrying the fundus with it. This is called the lever action of the pessary, the pelvic floor serving as the fulcrum, and he refers to his pessary as the "lever pessary." But this action of this pessary is seldom employed now, as there are more effective methods of replacement.

Again, in a case of movable uterus which can not be brought forward satisfactorily, if a pessary be introduced and the patient instructed to take the knee-chest posture twice daily, the uterus may be found forward at the next examination a few days later

Again, in some cases where the uterus can be raised considerably but can not be brought forward, a pessary introduced and worn just as if the uterus were forward, will, in conjunction with the knee-chest posture morning and evening, give the patient some relief—indicating that in that particular case the symptoms are due not so much to backward displacement *per se* as to the sinking of the uterus with the consequent disturbance of the circulation, which is relieved by the pessary in spite of the fact that the uterus is still in retrodisplacement. It is this holding up of the heavy uterus and the relief of the slight prolapse complicating the retrodisplacement, that accounts for the decided relief often secured by the use of the inflated ring pessary in cases of unreplaced retrodisplaced uterus.

Introduction of the Pessary.

Ordinarily the pessary is introduced with the patient in the dorsal posture, immediately after the uterus has been brought forward by bimanual reposition as described in chapter VII.

Before introducing a pessary, cleanse it thoroughly in an antiseptic solution and then lubricate it with a suitable ointment. In introducing it into the vaginal opening, if the opening seems rather small, put one finger in the vagina and depress the perineum strongly to make room for the pessary. Remember, in introducing a pessary or speculum or the examining fingers into the vagina, if the opening seems small and more room is desired, the pressure must always be made backward, depressing the perineum. The least pressure forward will pinch the tissues against the pubic arch.

The introduction or placing of the pessary is carried out as follows: Hold the pessary by the anterior end, depress the perineum well with one finger (Fig. 454) and introduce the posterior end with the breadth of the pessary lying in the antero-posterior diameter, which is the largest diameter of the opening. The pessary should be held somewhat obliquely so as not to make painful pressure on the urethra (Fig. 455). When the pessary is about half way in (Fig. 456) turn it so that the breadth of the pessary lies laterally (Fig. 457) and the posterior arm is directed upward. Then push the pessary along until it will not go any further. It stops because the posterior end is against the anterior lip of the cervix. Then introduce a finger into the vagina beneath the pessary, catch the posterior bar with the finger tip (Fig. 458) and depress it (Fig. 459) and then push the pessary past the cervix. Fig. 453 shows the pessary in place.

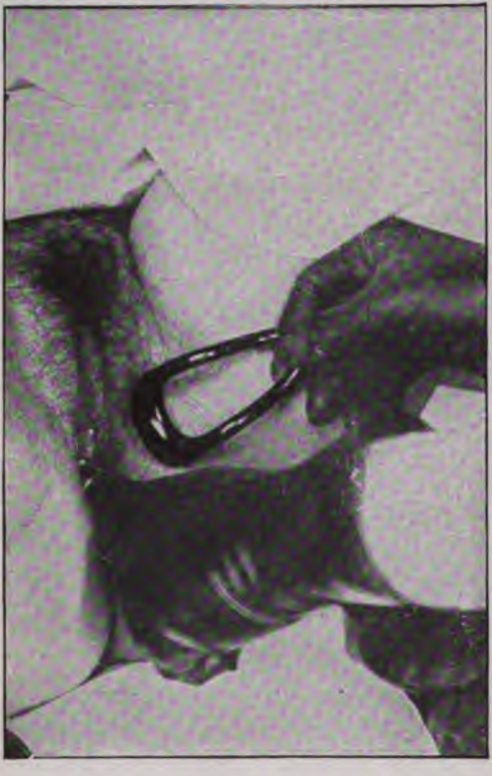

Fig. 454. Introducing the Pessary. First step—depressing the perineum.

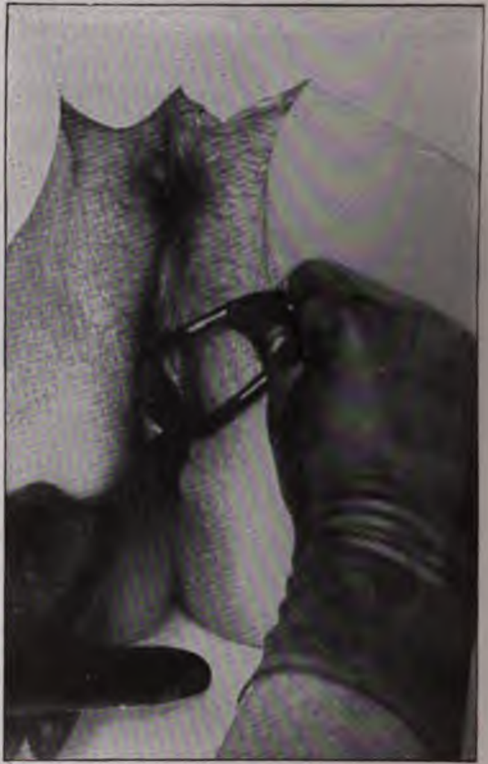

Fig. 455. Introducing the Pessary through the vaginal opening. The width of the pessary lies in the antero-posterior diameter of the opening, which is the long diameter, but is turned somewhat obliquely to avoid the urethra.

After the pessary is in place it is well to have the patient walk about the room a little, to see if there is any discomfort. If there is any decided pain or marked discomfort, try a smaller size or another form.

In those cases in which it is necessary to use the knee-chest posture to effect reposition and also in those cases in which it is thought advisable to use a pessary even though the uterus can not be brought well forward, it is advisable to introduce the pessary with the patient in the knee-chest posture.

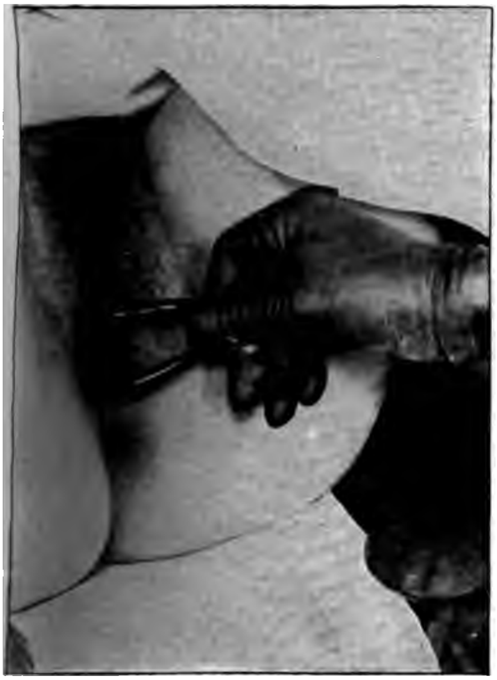

Fig. 456. Introducing the Pessary. The pessary is now well within the vagina and ready for turning.

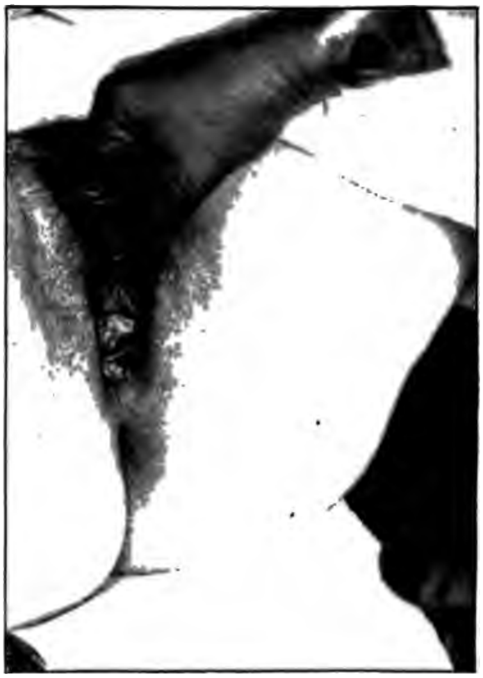

Fig. 457. Introducing the Pessary. The pessary is turned so the width lies transversely, for the transverse diameter is the long diameter of the vaginal canal, though not of the vaginal entrance. The pessary is then pushed in until its further progress is stopped by the cervix.

Instructions to Patient with Pessary.

The care of a patient having a pessary in place, includes the following points:—

Visits to the Physician. When the pessary is introduced the patient is directed to return in about three days. If the pessary is proving satisfactory then, she need not return again for a week. If everything is going well at this third visit, she need not return, except once every four to six weeks to have the pessary removed and thoroughly cleansed and replaced.

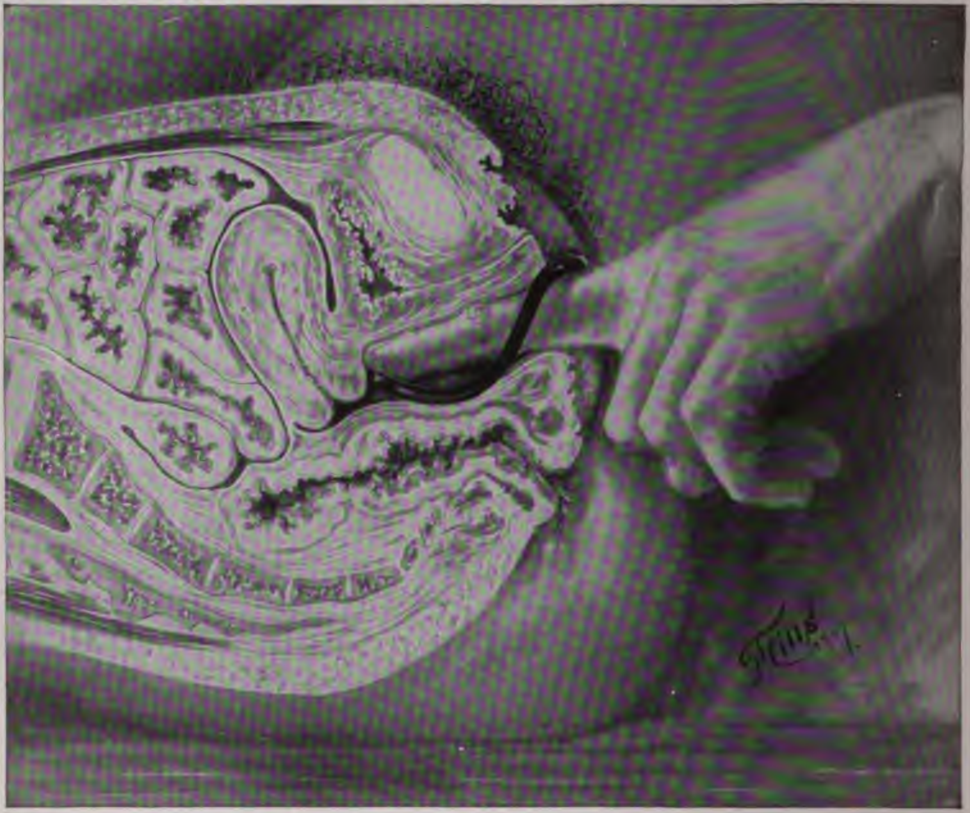

Fig. 458. Introducing the Pessary. The index finger is passed to the top of the posterior end, which is then depressed until it can be pushed past the cervix, as shown in Fig. 459.

There is always more or less uncertainty for the first week or so, as to just how the pelvic structures will accommodate themselves to a pessary. For that reason it is well to instruct the patient to return at once if any unusual pain is felt or if the pessary appears to slip out of position. But the patient should return in three or four days, even though she has no particular disturbance, for the uterus may have settled back into its old malposition.

At this second visit, inquire if the patient has noticed any protrusion or slipping of the pessary or has had any pain or discomfort from the pessary. A pessary which is entirely satisfactory should give little or no sensation of its presence, in fact, in most cases the patient would not know the pessary was there if she were not told. Inquire also how much she has been relieved from the previous discomfort, for which the pessary was introduced. Ascertain by examination if the pessary is in proper position and if it holds the uterus in proper position. If so, do not disturb the pessary but direct the patient to return in a week. If the uterus is out of position, remove the pessary, replace the uterus and introduce another pessary, better adapted to the case, and again direct the patient to return in three days, when another examination is to be made.

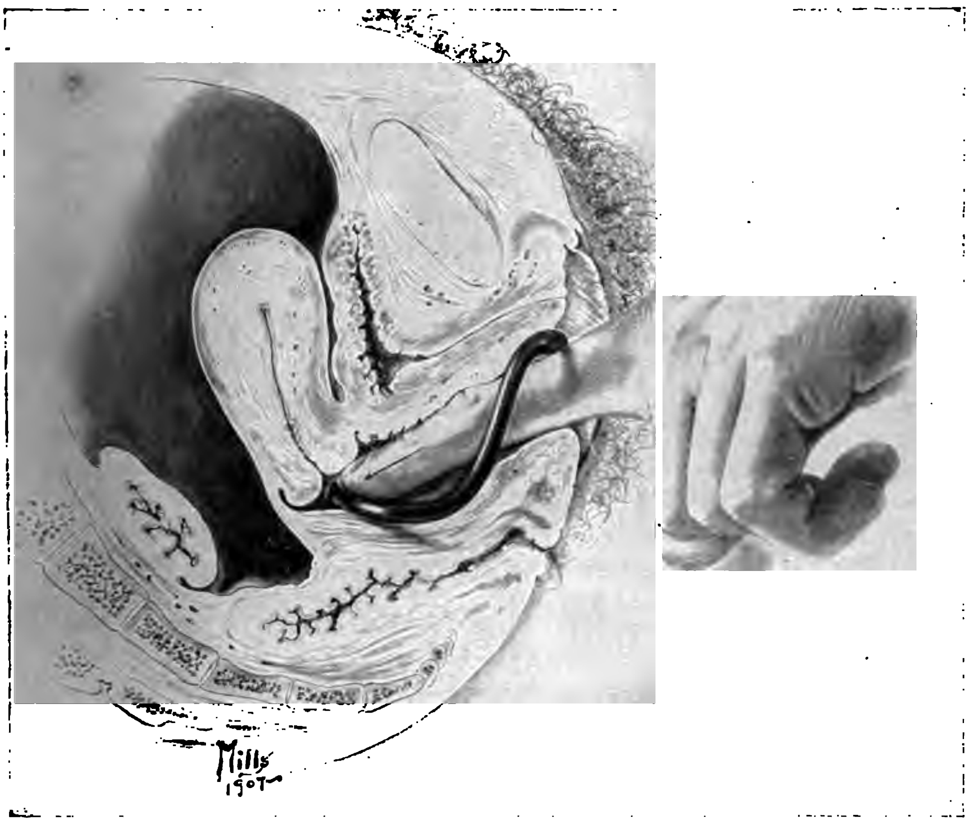

Fig. 459. Introducing the Pessary. The posterior end depressed and being pushed past the cervix. The pessary is shown in place in Fig. 453.

When the pessary is found satisfactory at the second and third visits, it is to be assumed that it will prove satisfactory right along, and as long as the patient feels well she need not return, except every month or six weeks as above indicated.

This return at regular intervals of a few weeks is important in every case (though, exceptionally, the interval may be longer) for three reasons—(a) because the pessary is liable to accumulate concretions that may prove irritating, (b) because long-continued pressure may produce ulceration at some point in the posterior vaginal fornix and (c) because it is important to know whether the pessary is doing the work it is used for, and if everything is going as it should. Injurious pressure on the wall is indicated by a distinct groove or ridge with infiltration in the affected area. When such is present, the pessary should be left out for a few weeks or a different form used. If necessary to leave the pessary out for a time and trouble is experienced from the uterus returning to its malposition, packing in the knee-chest posture or in the Sims posture may be employed during this interval. In many cases, however, a resort to the knee-chest posture night and morning is all that is necessary.

Douches. The patient wearing a pessary should take a vaginal douche every day or every few days. If the discharge is very free it may be advisable to take two or three douches daily. If there is practically no discharge two douches weekly may be sufficient. Ordinarily the patient is directed to take a douche once daily or every other day. The kind of douche to be taken varies with the conditions present—a large hot douche or an astringent douche when the indications previously given for them are present. When there are no special indications, I usually prescribe the bichloride douche or the aluminum acetate douche (see Formulae).

Knee-chest Posture. The knee-chest posture (Fig. 469) taken by the patient night and morning, is very useful in those cases in which the uterus tends to return to its old position or in which the patient complains of downward pressure in the pelvis. It causes the patient some inconvenience and is not necessary when the pessary holds the uterus well up and entirely relieves the symptoms. But in many cases of damaged pelvic floor, its use along with the pessary is very advantageous.

The **activity of the patient** need not be curtailed on account of the pessary. The pessary is meant to hold the uterus in proper position and restore the patient to comparative health, so that she can pursue her usual activities without disturbance. If the patient cannot pursue her usual activities, after the pessary has been worn a month or two, the pessary has failed of its purpose, and some more effective method of treatment is indicated.

As to **coitus,** the fact that a pessary is being worn is no bar to sexual intercourse. With the Thomas pessary and the Smith pessary, the anterior end lies so high in that it interferes but little, if at all. Even with the Hodge pessary, coitus may, in some cases, be accomplished with but little inconvenience. Coitus, however, causes marked pelvic congestion and this increases the liability of discomfort resulting from the pressure of the pessary. Consequently for the first few weeks, while the pessary is on trial so to speak, coitus had best be discontinued. Later, after the uterus has been sometime in its proper position and the pelvic structures are adjusted to the pessary, no restriction in.this direction is necessary ordinarily.

In some cases, the replacement of the uterus and wearing of the pessary is carried out principally to increase the chance of pregnancy, and in su is permissible from the first. It is well to mention this fact to the patient or her husband, as otherwise it may be thought that coitus is not possible while the pessary is in place.

If pregnancy should develop, the pessary should be worn just the same until the uterus has become large enough to prevent its sinking back into the pelvis. The douche should then be taken only warm—not hot, for a hot douche may excite uterine contractions and lead to miscarriage. Usually along in the third or fourth month the pessary is taken out, as it is of no further use and if left in longer it might cause irritation and disturbance.

Occasionally a pessary excites pain shortly after pregnancy takes place. If so, it should be removed, the patient being directed to take the knee-chest posture two or three times daily, to keep the fundus uteri forward. Tampons or tamponade of the vagina to keep the uterus forward is not advisable in these cases, as it might lead to miscarriage.

When to Discard the Pessary.

The time at which the pessary may be discarded varies much in different cases, and in each case is more or less a matter of trial. A very good rule is to leave out the pessary after the uterus has remained in position continuously for three or four months. Direct the patient to return in two or three days. If the uterus has returned to its old backward position, replace it and use the pessary again for several months.

If the uterus maintains its forward position with the pessary out, direct the patient to return again in two weeks. If then the uterus is in proper position and the patient feeling well she may be discharged, being directed to return if symptoms should at any time reappear.

In some cases the pessary may be permanently discontinued in three or four months, but in more cases it must be worn for six months or a year, while in certain cases, it must be worn a still longer time or even indefinitely.

If after the pessary is removed, the uterus shows a tendency to go backward, it is well to have the patient take the knee-chest posture occasionally for some months.

The Inflated Ring Pessary.

The action of the inflated ring pessary (Fig. 460, B) is principally to raise the uterus and adjacent tissues somewhat and to support them. It has no particular action in holding the cervix well back in the pelvis nor in maintaining the uterus in a proper forward position. Consequently the field of usefulness of this particular form of pessary is in those cases in which the uterus cannot be gotten into the forward position or can not be maintained there. The simple supporting of the uterus, thus overcoming the slight prolapse which is present in most cases of retrodisplacement, often gives the patient much relief, though the retrodisplacement has not been corrected.

On the other hand, such a pessary is sometimes used by the physician or by the r her own responsibility (this form of pessary being frequently advertised to the laity), in cases where complete replacement could be easily accomplished. In such a case, complete replacement with the subsequent use of the Thomas or Hodge pessary would tend to effect a cure, while the effect of the inflated ring pessary is imperfect and only temporary.

In the cases in which the inflated ring pessary is useful, some radical measures are usually preferable and the pessary is simply a temporary expedient to make the patient more comfortable while she is getting ready for operation. Some patients, however, prefer to wear the pessary indefinitely, even though it affords only partial relief, rather than submit to any operative measure.

This pessary requires a douche every day and should be removed and cleansed at least every week. It requires more care to prevent incrustation and irritation. The patient can usually remove and reintroduce the pessary satisfactorily herself after a little practice. Just before introducing it, the patient should take the knee-chest posture for a few minutes. Then lying on her back or side she introduces the pessary, which has been previously cleansed and lubricated. When coitus is desired, the pessary may be taken out in the evening and left out until morning. If desired a loop of strong string may be attached to the pessary to facilitate its removal. If the pessary becomes deflated, it may be reinflated with a hypodermic syringe, the needle being introduced through the thick spot designed for that purpose.

A pessary of about this form is made of hard rubber (Fig. 460, C) and is used in the same way. It does not become deflated and is less likely to accumulate incrustation and irritate the vaginal wall. It is unyielding, however, and for that reason is more likely to produce painful pressure at some point. Also a smaller size must be used, for this pessary cannot be compressed, as the inflated rubber pessary can, to pass the vaginal orifice.

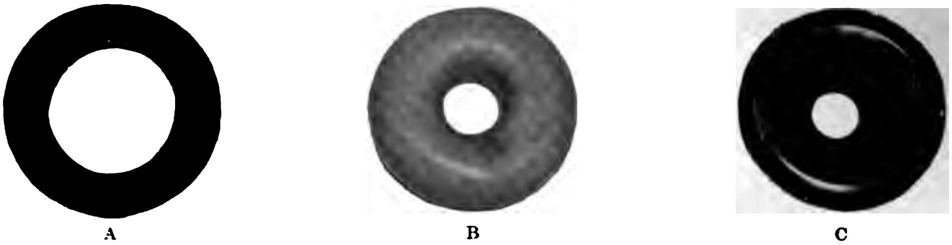

Fig. 460. A. Flexible Ring Pessary. B. Inflated Ring Pessary. C. Hard Rubber Disk Pessary.

5. Flexible Ring Pessary. The flexible-rubber ring (Fig. 460, A) is sometimes preferable to the inflated ring, particularly in cases where there is very free discharge. The opening being larger, the free discharge escapes easier and consequently there is less retention and irritation.

Pessaries for Prolapse of Uterus.

The treatment for prolapse is to raise the uterus and maintain the fundus in a forward position. The pessary that accomplishes this in a case of retrodisplacement is likewise beneficial in a case in which the prolapse is the principal feature.

Consequently, in the milder grades of prolapse, a Thomas or Smith or Hodge pessary may be all that is necessary to maintain the uterus in its proper position.

In many cases of prolapse, however, more so than in retrodisplacement, the pelvic floor has been torn so much that this form of pessary will not stay in satisfactorily. In such a case, a large inflated rubber-ring pessary may be introduced and then turned so it will not slip out. This does not hold the cervix back in the pelvis and the fundus forward, but it does plug the vaginal opening so the redundant vaginal wall and the uterus can not prolapse to the former extent. If the pessary tends to protrude, a pad over the genitals, with a firm T-bandage, may keep it in place comfortably.

6. Menge Pessary. A large thick rubber ring, turned crosswise in the vaginal canal will plug the opening effectually for a time. But when the patient walks around for a few hours, the ring shifts about until the edge is turned toward the relaxed vaginal opening and then it slips out. The Menge pessary (Fig. 461-A) consists of such a hard rubber ring, with a stem which prevents the pessary from turning. The stem is detachable as shown in Fig. 461-B. The thick ring is introduced the same as any large ring pessary and turned across

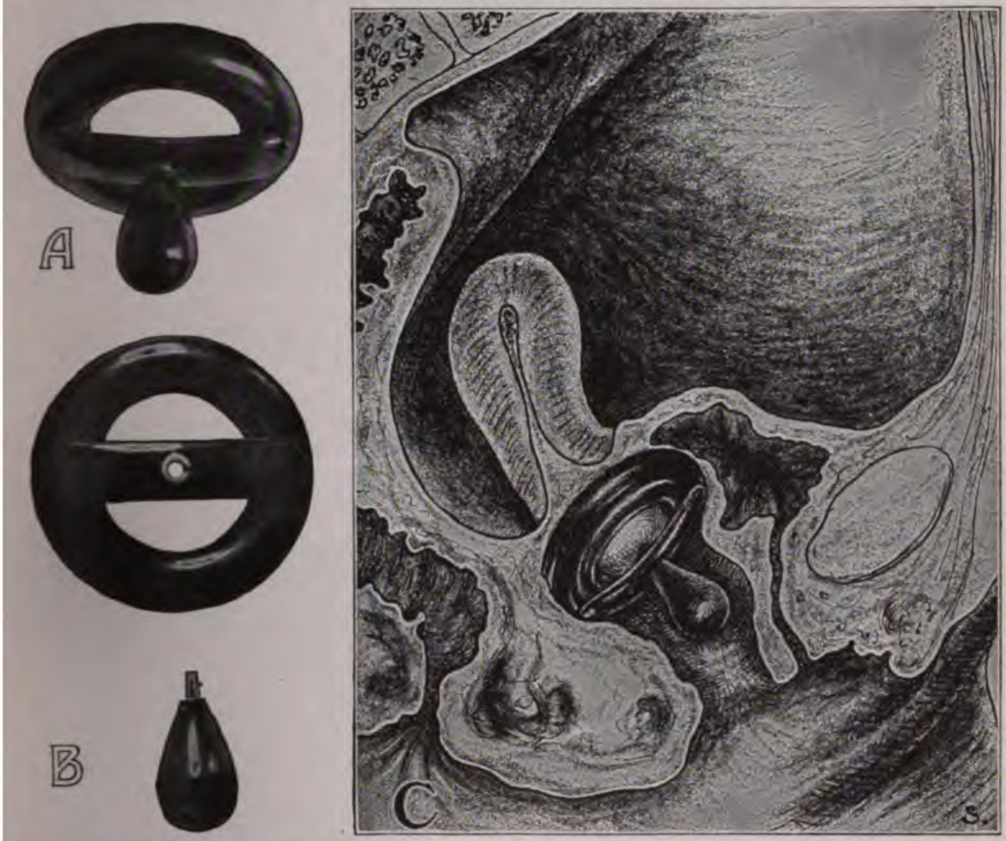

Fig. 461. The Menge Pessary. A, the pessary with the stem in place. B, the pessary with the stem detached from the ring portion of the pessary, preparatory to introduction of the latter. After the ring portion has been introduced, the stem is fastened in place as shown in C. The stem lies in the vaginal canal, and keeps the ring from turning into any position that will allow it to slip out.

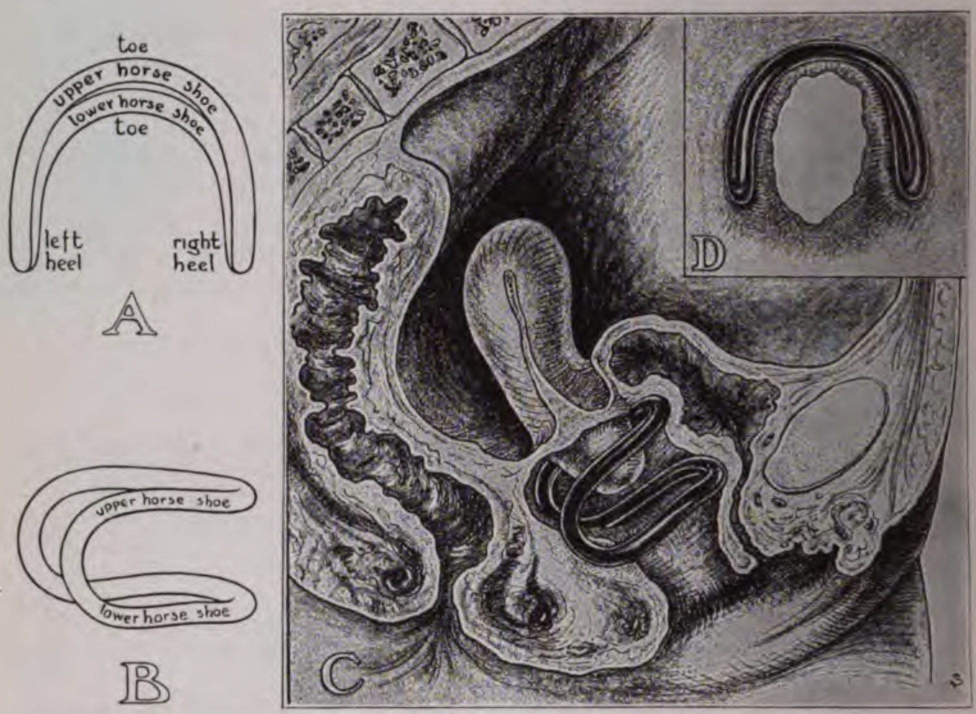

Fig 462. The Gehrung Pessary. A, the pessary as viewed from above. B, the pessary as viewed from the side. C, the pessary in place, showing the action of the upper arch in holding up the uterus and base of the bladder. D, showing how the heel on each side indents the tissues some distance from the vaginal opening, instead of pressing into the opening like a wedge, as do other pessaries.

the vaginal canal, with the hole in the cross-bar directed toward the vaginal opening. The stem is then fastened in place. The stem lying in the vaginal canal as shown in Fig. 461-C, prevents the ring from turning, and hence the vaginal opening is persistently blocked and the prolapse prevented.

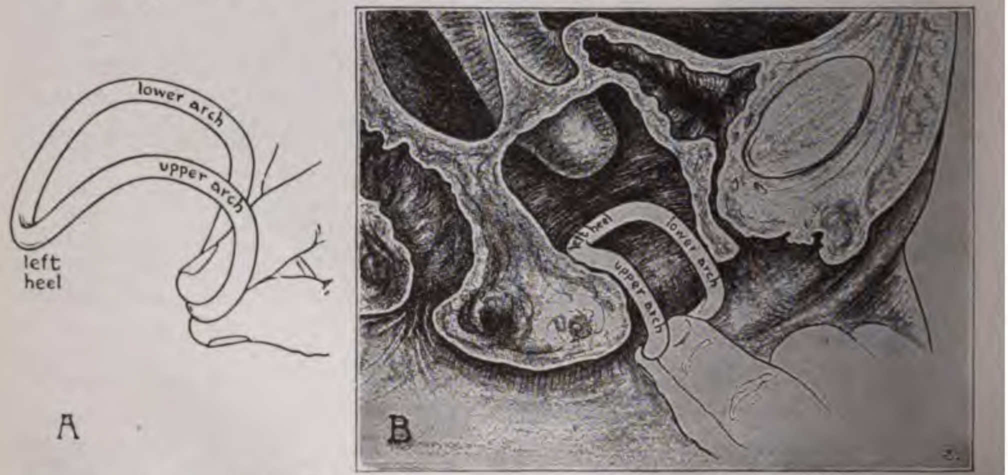

Fig. 463. Introducing the Gehrung pessary. A, showing how the pessary is held. B, first step in the introduction—see directions for introduction.

This pessary has proven very useful in severe cases, where operation was inadvisable or was refused, or where temporary relief was required while the patient was waiting for operation.

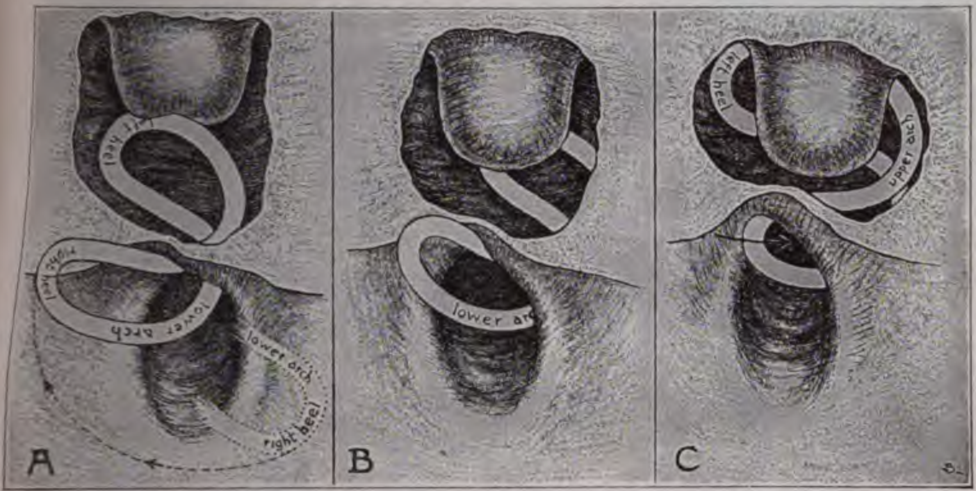

Fig. 464. Introducing the Gehrung pessary. A, swinging the right heel to the right side, which carries the left heel under the cervix to the left side and brings up the upper arch, which was below. B, pushing the pessary around the vaginal wall back of the cervix, in order to get the right heel within the vagina. C, further progress in the same direction.

7. Gehrung Pessary. The Gehrung pessary, originated by Dr. E. C. Gehrung, consists of two light arches of horseshoe shape joined at their heels (Fig. 462-A and B). When in position (Fig. 462-C) the lower arch or horseshoe secures support on the remnants of the pelvic floor at the sides of the vaginal opening (Fig. 462-D). This in turn supports the upper arch, which holds up the bladder and uterus, as shown in the illustration. This is the most satisfactory pessary that I have found so far for the treatment of inoperable prolapse or cystocele. The secret of its effectiveness in the severe cases with almost no pelvic floor, lies in the method of obtaining support from the remnant of the pelvic floor With the ordinary pessary the lower supporting portion

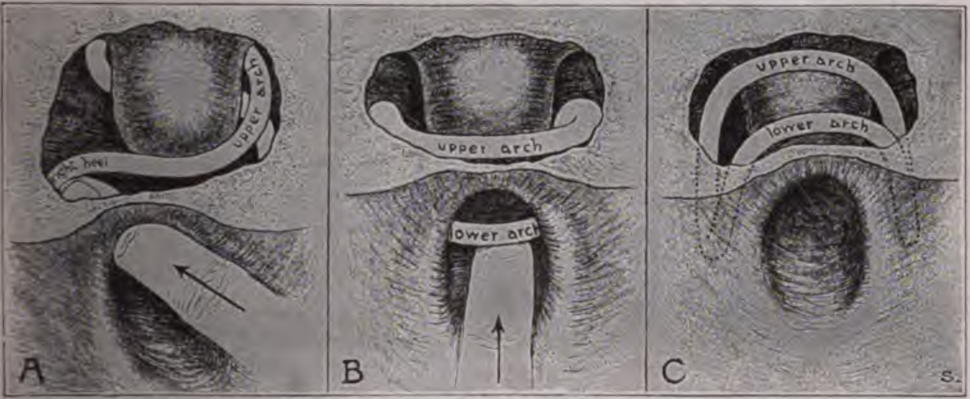

Fig. 465. Introducing the Gehrung pessary. A, the right heel within the vagina and being carried to its position on the right side. B, the two heels situated symmetrically on each side. The arches are still too low. C, the arches pushed up into place back of the symphysis.

presses against the vaginal opening in the form of a wedge, which tends to stretch the opening more and more—until finally the pessary slips out. Owing to the wedge shape of the presenting part of the pessary, there is a sidewise pressure which tends to push aside the shelf of pelvic floor upon which the pessary must depend for support. The result is that the small shelf of pelvic floor on each side is gradually flattened out against the pelvic wall, permitting the pessary to slip out. Even the Menge pessary has this wedge action to some extent.

With the Gehrung pessary, on the other hand, the supporting part of the arch, on each side presses into the shelf of tissue from above and some distance from its margin, as indicated in Fig. 462-D. This pressure *into* the superior surface of the supporting shelf causes a depression on each side (Fig. 462-D) in which the pessary becomes "set" so that it does not slip around. The more the pressure the more firmly it becomes set, after it is well placed. Acting in this way it does not tend to stretch the vaginal opening and slip out, as do the pessaries with wedge action. In fact, after this pessary has been worn for a while and is well set in each side, a smaller one will often answer the purpose. The parts seem to contract somewhat, when relieved for a time from the dilating wedge of prolapsed tissue.

The introduction and satisfactory adjustment of the Gehrung pessary requires considerable study and experience. In introducing the pessary the right heel is grasped in the fingers of the right hand, as shown in Fig. 463-A. The upper arch is below. With the right heel held to the left side of the vulva, the left heel of the pessary is pushed into the vaginal opening as far as it will go (Fig. 463-B). Then the right heel, still grasped in the fingers of the right hand, is swung across to the right side as indicated in Fig. 464-A. This brings uppermost the upper arch which was below, and causes the left heel of the pessary to pass under the cervix (Fig. 464-A) to the patient's left side (Fig. 464-B). Now the pessary is pushed in farther, the left heel passing around back of the cervix (Fig. 464-C) far enough to permit the right heel to slip inside (Fig. 464-C). The right heel of the pessary is then pushed along the vaginal wall to the right side (Fig. 465-A), until the right and left heels are situated symetrically on each side of the vaginal opening (Fig. 465-B). The next step is to push the pessary up (Fig. 465-B) until the lower arch lies above the vaginal opening and back of the urethra, and the upper arch supports the uterus and base of the bladder (Fig. 465-C). This puts the supporting arches in the position shown in Fig. 462-C, and the heels of the pessary take hold at the sides of the vaginal opening as indicated in Fig. 462-D.

If the heels tend to slip around at first, a little tannic acid powder may be used on each side, to prevent slipping until the heels become set.

8. **Hewitt Pessary.** This pessary, devised by Dr. W. R. Hewitt, consists of three air-cushion pessaries securely fastened together. The three air-cushions differ in size, the largest being at the bottom and the smallest at the top (Fig. 466-A). This pyramidal air-cushion acts as a plug to block the vaginal opening (Fig. 466-B) and prevent the escape of the uterus or bladder. It presents the following advantages: (1) the superimposed rings give a pyramidal shape to the pessary and thus it holds up the base of the bladder and the redundant vaginal walls more effectively than a single ring; (2) the added length prevents the pessary turning and hence has much the same effect as the stem in the Menge pessary; (3) the patient herself may remove the pessary for cleansing and replace it. It presents the following disadvantages: (1) like all large ring pessaries, it has the wedge action which tends to stretch the vaginal open-

ing and cause the pessary to work out, unless so large as to make uncomfortable pressure; (2) its action is simply that of a ball-stopper and hence it must necessarily be large and heavy; (3) it interferes with coitus and with satisfactory douching; (4) being of soft rubber, it must be removed for cleansing very frequently. The Hewitt pessary in action and effectiveness is about like the Menge. They are each inferior to the Gehrung pessary in effectiveness, comfort and restoration of physiological function. The two light arches of the Gehrung pessary give the required support without unnecessary weight and without plugging the vagina. Hence sexual intercourse may take place, effective douching is possible and the pessary when well adjusted may be worn for several weeks and even for several months without removal. But the other two pessaries mentioned are much more easily understood and hence will have more general use.

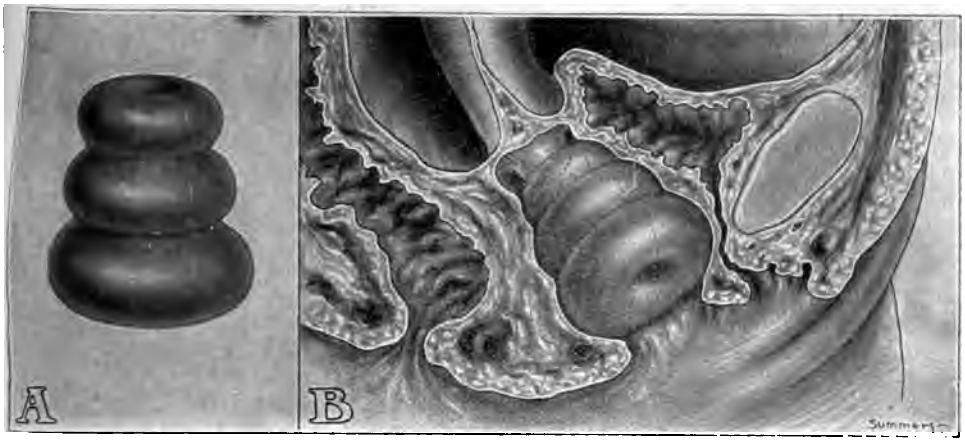

Fig. 466. The Hewitt Pessary. A. Showing the construction of the pessary—three inflated soft rubber rings, fastened together. B. The pessary in place, showing the action of the pyramid in holding up the uterus and the base of the bladder. The length of the pessary prevents its turning, as does the ordinary single-disk pessary.

9. Cup and Belt Pessary. This form of support consists of an abdominal belt to which are attached rubber cords which in turn hold in place a hard rubber stem and cup extending into the vagina. It is an old form of pessary which sometimes gives much relief in extreme cases in which every form of pessary depending on the pelvic floor for support, slips right out. Of course this pessary as well as other pessaries are only makeshifts giving temporary relief, and curative operative procedures are indicated in suitable cases. But some of these women are not in physical condition for operation, while some others refuse operation, preferring to get along with a fairly satisfactory pessary. A modification sometimes useful is that form in which a ball is substituted for the cup at the top of the stem.

X-RAY TREATMENT, ETC.

Cauterization, curettage, electricity, local blood-letting and submucous injections of paraffin, are measures which have occasionally been employed about the external genitals with benefit. Radium and the Finsen light are used but little, if at all.

The X-Ray has proven useful in quite a variety of gynecologic affections. The development in X-Ray work has become so extensive in the last few years that it now constitutes a specialty in itself. The results depend on the accurate selection and co-ordination of numerous technical details, which vary greatly in different classes of cases. The best results can be secured only by one thoroughly familiar with the therapeutic use of the X-Ray in the various affections. The treatment is not given a fair chance when applied in a haphazard way by one familiar only with its diagnostic use. This fact should be kept in mind in every estimation of X-Ray results.

External Genitals. In severe pruritis vulvae, persisting in spite of other measures, X-Ray treatment has effected a cure. Even when the process has progressed to well marked kraurosis vulvae, this treatment as a rule gives relief, and should be given a thorough trial before resorting to excision of the external genitals. After excision the process may appear in adjacent surfaces, finally requiring X-Ray treatment to give relief.

In tuberculosis of the vulva, in ulcus rodens, and in chronic eczema, X-Ray treatment has proven exceedingly useful. In any chronic, non-malignant ulceration or infiltration that resists other measures, it may be given a trial with good prospects of a cure.

In malignant disease, however, even when apparently superficial, operation, including wide excision of the lesion and its lymphatic field, is the most certain remedy. The X-Ray should not be depended on in operable cases. In inoperable cases, it is useful in retarding growth and relieving pain.

Ovaries. Under the influence of the X-Ray the ovaries gradually atrophy and lose their function. This makes it useful in cases of excessive ovarian activity, as in sexual hyperesthesia (nymphomania). In addition to lessening the ovarian activity in these cases the X-Ray may be applied to the external genitals to diminish the congestion and hypersensitiveness there.

In any condition in which it is advisable to diminish ovarian activity, the X-Ray is useful. By continuing the treatment long enough the patient may be rendered permanently sterile. Thus it constitutes a two-edged weapon—one that is exceedingly effective in various directions but requires much care and judgment in handling. There are cases in which sterilization, with the coincident diminution in the pelvic blood supply, would be of great benefit. While in other cases, for varied reasons, any effect in this direction must be most carefully avoided.

Uterus. The ovarian effect just mentioned tends to diminish the blood supply of the uterus and thus influences favorably pathological conditions in that region. Cases of fibromyomata are generally greatly benefited by this treatment. The metrorrhagia is diminished or eliminated and in many cases there is marked shrinking in the size of the tumor. It is especially indicated in patients not in good condition for operation, where malignancy, infection and submucous fibroid can be excluded. Of course this treatment means a considerable outlay in time and money, and even then operation may finally have to be resorted to. The cases for this treatment should be carefully selected with due regard to the contra-indications. Used accurately, by one experienced in this line of work, it is useful in securing relief, more or less permanent, in inoperable cases, and in stopping blood-loss and building up anemic patients for operation.

Chronic inflammation of the uterus, also, with the congestion and metrorrhagia connected therewith, may be much benefited by X-Ray treatment. However, the sterilizing ovarian effect must be kept in mind and contraindicates this treatment in most patients in the child-bearing period.

1. They may exercise an antiseptic or astringent or anesthetic effect, limited to the surface to which they are applied. Owing to peculiarities in the nature and situation of the endometrium, an intra-uterine application of an **antiseptic** does not ordinarily have much influence in checking the activity of bacteria that have gained a foothold there. The three most important influences limiting bacterial penetration into the uterine wall are (a) an intact epithelial surface, (b) the bacteriacidal influence of leucocytes and blood serum and lymph, and (c) the absence of irritation (toxic, chemical, mechanical) within the cavity.

In a patient with bacterial invasion of the endometrium, after the uterus has been cleared of placental remnants and good drainage secured (removal of toxic, chemical and mechanical irritation) the issue depends almost wholly on the bacteriacidal and antitoxic influence of the leucocytes, blood serum and lymph. The efficacy of any therapeutic measure employed must be judged largely by its influence on this battle beneath the surface, rather than by any superficial effect. The beneficial effect of killing a few bacteria upon the surface is more than overbalanced by the local disturbance which the application occasions. It adds irritation to the already great irritation from the bacteria and their products, and it opens up new avenues for invasion, by abrasion of the protecting epithelial covering. In chronic cases, the bad effect of such applications is not great, because nature has the process well limited, but occasionally, even in these cases, there will be considerable disturbance following the application, due to immediate extension of the infection deeper into the uterine wall or into the tubes or parametrium. In the acute and subacute stages of bacterial invasion of the uterus (puerperal or nonpuerperal) an intra-uterine application very frequently causes an aggravation of the trouble, as evidenced by a chill and a sharp rise of temperature within a few hours.

It may, I think, be stated as a general proposition, that intra-uterine applications for antiseptic effect, in the acute, subacute or chronic stages of bacterial invasion, do more harm than good. The harm is due, not to the presence of the antiseptic, but to the abrasions of the endometrium incident to the application.

If the antiseptic effect could be secured without these minute traumatisms, which are incident to the introduction of any instrument within the cavity, the applications might be beneficial, provided they are made in an aseptic way. There is one method that promises something along this line, namely, the use of uterine suppositories, of such consistency that they can not abrade the surface of the endometrium.

The use of an **astringent** intra-uterine application is advisable in certain exceptional cases of persistent bleeding or free discharge from the endometrium, not dependent on bacterial invasion or a new growth. There are many cases of bleeding (especially menorrhagia) due simply to chronic congestion and hyperplasia of endometrium. It is principally in those dependent on subinvolution and which have not been relieved by internal treatment (laxatives, general tonics, uterine astringents) and hot vaginal irrigation and other measures directed towards diminishing the pelvic atony and congestion, that local astringent applications are of service.

In most of these persistent cases it is preferable to remove the thickened endometrium with the curet. But in some cases the symptoms are hardly sufficient to demand curetment, or the patient objects to it. In such a case a few astringent applications to the endometrium, made under proper precautions, may do much good without doing damage. A few abrasions of the epithelium by an aseptic application in such a case, are of less consequence than when made in an infected cavity where there are bacteria ready to enter the abrasions. Also the chemical and mechanical irritation is better borne because there is no deep-seated bacterial activity. Occasionally such an application is indicated in the simple hyperplastic endometritis in a virgin. But the discomforts and difficulties of a satisfactory intra-uterine application in the virgin are such that when intra-uterine treatment is necessary, thorough dilatation under anesthesia and curetment is usually the preferable method.

In infective endometritis, the application will probably do more harm than good, except in those old cases in which the bacteria are dead or so attenuated that the condition is practically one of simple endometritis.

In bleeding due to fibroids or malignant disease, astringent applications exercise no influence over the course of the disease, and may cause infection and thus increase the danger of the necessary operation. For temporary control of bleeding while waiting for operation, general measures and internal medication and firm vaginal packing will nearly always suffice. For the inoperable cases, other methods more effective are at our disposal.

An **anesthetic** application, such as cocaine or orthoform, is useful when applied about a sensitive internal os, preceding dilatation of the same. The pain is usually considerably diminished. Applications of anesthetic substances to the endometrium proper are of little benefit and present the dangers common to all intra-uterine applications.

2. They may destroy diseased tissues. This will be spoken of under cauterization.

3. They may exercise a hygroscopic effect. This effect, secured by the small amount of hygroscopic material retained in the uterus, is so slight that intra-uterine applications for this purpose are not advisable.

What harm can intra-uterine applications do?

Same that vaginal applications may, and also:
May carry infection into the uterus.
May increase bacterial disturbance already in the uterus.

1. They may cause the same harmful effects that vaginal applications may. That is, they may (a) cause patient to come to office when she should be resting at home, (b) cause postponement of effective treatment until the disease is past cure and (c) convert a neurasthenic or hysteric individual into a confirmed invalid by fixing attention on some trivial local disturbance.

2. They may carry infection into the uterus and change some simple disturbance into a very serious one. This has happened many times and constitutes one of the most serious objections to intra-uterine applications. By taking proper care of the cervical canal with an antiseptic, infection can usually be avoided.

But even with this care, infection may be carried in from an apparently healthy cervix. It is an ever-present danger and must be over-balanced by the probable benefit in the particular case, before an intra-uterine application is advisable.

3. **They may increase a bacterial disturbance** already in the uterus, as previously explained.

Methods of Intra-Uterine Application.

1. With Cotton-wrapped Applicator. An intra-uterine application is made by wrapping, with disinfected fingers, a small amount of absorbent cotton about the end of an applicator (Fig. 467, b), saturating the cotton with the desired medicine and then carefully introducing it through the cleansed and dilated cervical canal into the cavity of the corpus uteri. In making an intra-uterine application, the same antiseptic care must be observed as in sounding the uterus.

It is well to prepare a number of cotton-wrapped aluminum applicators (Fig. 467, c) and have them in sterile wide-mouthed bottles (Fig. 467), some dry sterilized and others in some of the solutions frequently used. Then you can be certain that the cotton on your applicators is sterile, as it is very likely not to be if it is twisted on hurriedly during the office treatment, for it is difficult to sterilize the fingers and keep them sterile.

2. With Gauze. Another method and a very effective one for bringing medicine in contact with the endometrium, is to soak the end of a small strip of antiseptic gauze in the medicine and carry it into the uterus and leave it there. The remaining part of the gauze is packed against the cervix to hold the uterine portion in place. The other end of the gauze is brought near the vaginal outlet so that the patient may remove it after several hours.

3. Slippery-Elm Applicator. A method somewhat similar to the last mentioned, is the use of a small slippery-elm tent, sterilized and dipped in the medicine and carried into the cavity and left there. A string is attached by which the patient can remove it as directed. My colleague, Dr. Frank A. Glasgow, thinks very highly of this device, and for many years has used it almost exclusively in intra-uterine applications.

4. Uterine Suppositories, or soluble uterine bougies, furnish another method of applying medicine to the endometrium. Protargol and iodoform are the medicines usually incorporated in them.

It is possible that there will be worked out along this line, a method of making effective antiseptic and astringent applications without mechanical disturbance of the endometrium. If so this might prove of decided help in the treatment of bacterial invasion, in both the acute and chronic stages. It seems to me that more will be accomplished in this direction by using the penetrating antiseptics, such as collargolum or Crede's ointment, than by the use of the surface antiseptics usually employed.

The injection of medicines into the uterine cavity by means of the intra-uterine syringe, I can not recommend. Its danger outweighs its advantages.

For What Effects Indicated.

As previously explained, the only intra-uterine applications advisable ordi are those for an astringent or anesthetic effect in the non-infected uterus even these only in exceptional cases and for a short time.

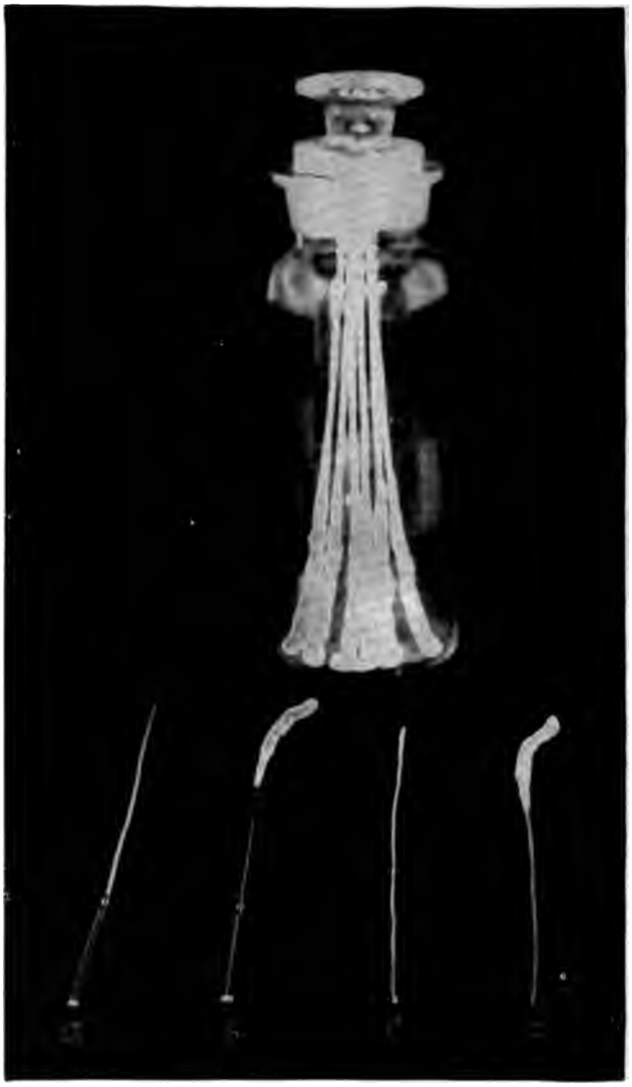

Fig. 467. Applicators for Intrauterine Treatment. a. The ordinary handled applicator. b. The same wrapped with cotton, preparatory to dipping it into the medicine to be applied within the uterus. c. Plain aluminum wire applicator, nine inches long. d. The same wrapped with cotton. The jar contains prepared applicators like (d), and is ready to receive the solution in which they are to be kept.

Long continued intra-uterine applications do little or no good and may do much harm. They may cause the inflammation to extend deeper into the uterine wall or into the parametrium or into the Fallopian tubes. If no decided beneficial effect is apparent from a few applications, made at intervals of several days, they should be discontinued and more effective measures employed.

Medicines Used for Intra-Uterine Application.

The medicines used for **astringent effect** are:—

Protargol, 5 to 10%.
Formol, 20 to 40%.
Iodized Phenol (Tinct. iodine and carbolic acid, equal parts)
Carbolic Acid, 10 to 95%.
Copper Sulphate, 10%.
Adrenalin Chloride, 1-1000.

The medicines used for **anesthetic effect are:—**

Cocaine Hydrochloride, 10 to 20%.
Orthoform.
Chloretone.

Local anesthetic applications are seldom used within the uterus. About the only indication is for the diminution of pain due to dilatation of the cervical canal. A few minutes before the dilatation an application of the desired local anesthetic is made along the canal, especially about the internal os which is the most sensitive part.

HOT WATER IRRIGATION.

Intra-uterine irrigation is employed in the treatment of **acute endometritis,** particularly that form caused by infection following labor or abortion. With the same antiseptic precautions as for sounding the uterus, the double current irrigating tube is introduced into the uterine cavity and a large amount (half a gallon to a gallon) of hot sterile water, or normal salt solution, is allowed to pass slowly through the uterus. This removes mechanically a large amount of the infective material and the effect of the hot water is beneficial in tending to allay the inflammation. In some cases of puerperal sepsis, this irrigation is sufficient to check the trouble, but in other cases there remains infected material that must be removed by the finger or curet. One thorough irrigation is usually all that is advisable, provided the uterine cavity drains well. Of course if there is distinct retention of pus within the uterus then the cervix must be opened and the pus washed out as often as such retention occurs. Intra-uterine irrigation has been used also in the treatment of acute gonorrhoeal endometritis but the effect was not such as to encourage its use.

Prolonged hot intra-uterine irrigation has been used also in the treatment of **chronic endometritis** with decided benefit in some cases. In the uterus not recently pregnant, the cervix may require considerable dilatation before it will admit the irrigating tube. The required dilatation can usually be easily accomplished by graduated cervical dilators, of hard rubber or metal.

In addition to the dangers incident to all intra-uterine manipulations (irritation, abrasions, infection), irrigation presents the danger of fluid extending into the tubes and out into the peritoneal cavity. To avoid this, the return-flow must be unobstructed and the irrigating receptacle not more than two feet above the uterus. In puerperal infection, after the uterus is thoroughly cleansed of placental remnants and infected clots, and free drainage is secured, the less intra-uterine interference for irrigation or other cause, the better as a rule.

In chronic endometritis the treatment by intra-uterine hot water irrigation is still on trial. The indications so far are that in the cases really requiring intra-uterine treatment, more effective methods are preferable.

CURETMENT.

The use of the curet within the uterus in office work is very limited. It is used nearly altogether for diagnostic purposes, though occasionally in a case of hypertrophic endometritis with a wide cervical canal, it may be advisable to curet sufficiently to remove a large part of the endometrium and secure a therapeutic effect.

The precautions are the same as for sounding the uterus.

Usually the Sims posture will be found most convenient.

Regular curetment under anesthesia, properly carried out in suitable cases, is one of the most beneficial of gynecologic therapeutic measures. By it, the chronically diseased endometrium may be largely removed. This stops the bleeding and leaves the surface in a good condition for the rapid regeneration of a comparatively healthy endometrium (Figs. 589, 590, 591). In practically all cases of chronic uterine bleeding or free discharge, in which the trouble is not amenable to a few intra-uterine applications, regular curetment under anesthesia is indicated both for therapeutic effect and for diagnosis. Regular curetment is considered in detail in chapter VI. under Chronic Endometritis.

CAUTERIZATION OF ENDOMETRIUM.

Destruction of the endometrium by cauterization was formerly much practiced in cases of persistent bleeding or discharge. It has been found, however, that in all but exceptional cases, a curetment is more effective and leaves the uterus in better condition for the regeneration of a healthy endometrium, as explained and illustrated in chapter VI.

In cases where curetment can not be carried out or is not effective, cauterization may be employed. For accomplishing this there are three methods—by chemicals, by steam, by electricity.

Cauterization of Endometrium by Chemicals. Chloride of zinc was formerly much used, as was also nitric acid. The effect of these strong deeply cauterizing agents in many cases was to destroy the endometrium beyond the possibility of satisfactory regeneration (see Fig. 592), the interior of the uterus being in many cases converted into a mass of scar tissue.

Carbolic acid (95%) does very well as a superficial cauterant, but it does not cauterize deeply enough to approach in effectiveness curetment as a means of removing a diseased and bleeding endometrium. When a superficial effect only is required, it does very well, applied as an ordinary medicated intra-uterine application. Care is necessary, however, to avoid cauterizing the vaginal wall and also to avoid concentrating the effect in the narrow part of the cervical canal, near the internal os, with almost no effect above. This is avoided by having the cervical canal well dilated, so the charged applicator will pass in easily.

The stronger formol solutions (30% to 50%) have a superficial cauterizing effect.

Cauterization of Endometrium by Steam. By means of the Pincus apparatus, the intra-uterine application of steam has been made practical. A thorough curetment (under anesthesia) precedes the application of steam. Then the steam, under the control of the Pincus apparatus, is applied for a few seconds. This cauterizes the interior of the uterus, and stops metrorrhagia in some cases where other measures, including repeated curetment, have failed.

It is a dangerous measure, however, and is not suitable for general use. It has caused deaths, also atresia of the uterine canal necessitating subsequent hysterectomy. It is not to be used as a substitute for curetment or other less dangerous measures, but is to be employed only as a substitute for hysterectomy in cases of persistent metrorrhagia due to a non-malignant pathological process in the endometrium.

Cauterization of Endometrium by Electricity. This is often very effective where a mild cauterizing effect is desired, to check a persistent menorrhagia or metrorrhagia not dependent on malignant disease nor active infection. The treatments may be given in the office easily and with but little discomfort to the patient in suitable cases. Where curetment is not required for diagnosis, electricity may in some cases be used as an effective substitute for it, and anesthesia thus avoided.

The details of the application of electricity in this and other cases are given below.

ELECTRICITY.

Electricity is a useful method of treatment which has fallen into disrepute because too much was expected of it and claimed for it. The manner of its presentation was confusing and, with the small results, discouraging. It was put forward as a wonderful cure-all, with a mysterious source, action and effect. Its clinical use and understanding supposedly necessitated the perusal of volumes of explanations—sensible and absurd, chemical, physical, physiological and psychical. By the time the reader had made good progress into the explanations, he was so bewildered and befuddled that the only tangible conclusion he could reach was that it was a wonderful remedy and must certainly produce wonderful results for whatever used.

When the actual clinical results were viewed in the same way that results from therapeutic measures without mysterious trimmings were viewed, it was found that many of the strongest claims were without foundation in fact.

Because of this conspicuous failure in certain particulars, some have been led to the mistaken idea that it is a total failure as a therapeutic agent. Less of mystery and finely-spun theorizing and more of common sense and critical testing of results by reliable methods, have shown that its usefulness in strictly gynecological cases is very limited, but within those limits it is effective.

Apparatus Required.

It is necessary to have an electrical table-plate or switch-board arranged for delivering, controlling and measuring the current, and a separate converter for the cautery. The current itself is preferably supplied from a suitable street current, if that is available. In places where there is no street current, dependence must be placed in cells of suitable character and number, placed in the basement or elsewhere.

Electrodes. There should be one LARGE ABDOMINAL ELECTRODE made of sponge or some satisfactory substitute. Just before using each time the surface of the electrode may be covered with a layer of absorbent cotton, which keeps it from direct contact with the skin of the patient and thus does away with any possibility of contamination from one person to another. By using a wide thick piece of absorbent cotton, the contact surface of the electrode may be increased as desired. This increase in contact surface is very useful for the abdominal electrode when giving strong currents.

Two VAGINAL ELECTRODES, one monopolar and one bipolar, are required. These may be used also as rectal electrodes.

Two INTRA-UTERINE ELECTRODES, one monopolar, and one bipolar, are required. They must be so constructed that they can be sterilized each time before use. The intra-uterine electrodes may be used also as urethral electrodes.

A very convenient set of monopolar electrodes is that of Goelet's. There are three sizes in order to make them effective in the treatment of cervical stenosis and persistent menorrhagia and metrorrhagia.

In the treatment of persistent uterine bleeding the effect desired is a mild cauterization of the endometrium. This is secured as later explained by a current of 30 to 40 m. a., the intra-uterine electrode being the positive pole. When the positive pole is composed of copper it is corroded by the current and there is secured some cataphoresis—that is, the copper salts are projected slightly into the adjacent tissues, increasing the beneficial effect.

For regular cautery work (excision of growths, etc.) it is necessary to have a cautery handle with two cautery points, one point knife-like, for cutting, and the other cone-shaped for touching surfaces superficially.

Rules of Application.

1. Study your electrical outfit and experiment with it until you are acquainted with all its component parts and know by experience what it will do under ordinary circumstances. You can not get this knowledge by reading a description of the apparatus and the directions for operating it. It can be acquired only by actually handling and experimenting with it.

2. Wherever an electrode is to be applied to the skin, the skin ctrode should be well moistened. If this precaution is not taken. t able pain and not much current, for the dry skin is r

See that there is no current until everything is in place. Adjust the electrodes in place before connecting them with the battery. When connecting them with the battery see that the current is entirely shut off.

3. After the electrodes are in place and connected by the conducting cords with the battery, then by means of the current controller turn the **current on very gradually.** If the patient complains of pain while there is only a small current, it means that there is poor contact or too small an area of contact between one of the electrodes and the patient. If the indicator of the milliamperemeter fails to move up, it means that there is a break somewhere and that there is no current passing between the electrodes. Turn on only a very small current until it is seen that everything is working nicely and then the strength may be gradually increased to the desired amount.

4. **Indifferent electrode.** In all pelvic applications, where two electrodes are used, the larger electrode is placed on the lower abdomen or on the back in the lumbar or sacral region. It is disposed in relation to the active electrode so that the current will pass through the affected tissues. Consequently, in most cases it is placed over the lower abdomen. This large electrode is called the indifferent electrode because there is no particular effect near it. It must be large enough (must spread over enough skin surface), to carry the required strength of current without marked irritation of the surface. If the contact area is too small for the strength of current, the skin becomes very red and the patient complains of tingling or burning. In cases where a counter-irritant effect on the skin is desired, a strong current with an undersized electrode may be used for that purpose. Ordinarily, however, the indifferent electrode should be so large that there is no effect on the skin beyond a slight tingling and a temporary redness. If any metal part of an abdominal electrode comes in contact with the skin, while a strong current is passing, it will cause a burn and resulting blister.

5. **The active electrode** is the internal one, the one in the uterus or vagina or urethra or rectum as the case may be. If the application is wholly external, the smaller of the two electrodes is the active one and is usually placed nearest the seat of the lesion or the pain (the external applications are usually made for pain), the larger electrode (indifferent electrode) being placed opposite on the abdomen or on the back.

The internal electrodes (intra-uterine, vaginal, urethral, rectal) are ordinarily used bare so that the metal comes in direct contact with the adjacent surface. In cases of vagino-abdominal or vagino-dorsal application in which it is desired to use a strong current, the vaginal electrode is wrapped with absorbent cotton which is well moistened before introduction. By increasing the amount of the wrapping, the contact surface of the vaginal electrode (and consequently the strength of the current that may be used without discomfort) may be increased as desired.

6. The active electrode is the **positive pole** when it is GIVING the current to the other one, it is the **negative pole** when it is RECEIVING the current fromthe other one. The active electrode is made positive or negative as desired by means of the pole changer.

7. **The local effects** of the **positive pole** are to diminish the amount of blood in

the immediately adjacent tissues (checks hemorrhage and lessens congestion) and to relieve pain. It is used to check uterine bleeding due to endometritis, subinvolution, or fibroids, and to relieve pain due to congestion, old inflammatory trouble or neuralgia.

The local effects of the **negative pole** are to increase the amount of blood in the immediately adjacent tissues. Consequently, it causes active congestion, increases functional activity, increases growth and hastens the absorption of chronic exudates. It is used in cases of amenorrhoea, scanty menstruation, poor development of uterus or ovaries, and for plastic or serous exudates remaining in the pelvis after acute symptoms have long subsided.

The relative quality of action of the two poles is about the same for both the galvanic and faradic currents.

8. With the faradic current, one may use either the primary or secondary current.

The primary current is more stimulating and is used to overcome relaxation of tissues and to increase functional activity.

The secondary current is more sedative in its effect and is used to relieve pain due either to congestion or to neuralgic conditions. With the faradic current there is another disposition of the poles, namely, the placing of the two close together in the same electrode. This constitutes the bipolar electrode. Used with the secondary current, it is especially effective in relieving local pain.

9. The various locations of the electrodes for pelvic treatment may be designated as follows:

On External Surfaces—Dorso-abdominal, Sacro-abdominal, Perineo-abdominal, Perineo-dorsal.
In Vagina—Vagino-abdominal, Vagino-dorsal, Bipolar vaginal.
In Uterus—Intrauterine-abdominal, Intrauterine-dorsal, Bipolar intrauterine.
In Rectum—Recto-abdominal, Recto-dorsal, Bipolar rectal.
In Urethra—Urethro-abdominal, Urethro-dorsal, Bipolar urethral.

Other methods of application such as general galvanization and general faradization and applications of static electricity, while frequently useful in the treatment of certain conditions associated with gynecological diseases, belong to general medicine and will not be described here.

10. Manner of using electricity for the different affections.

a. For **uterine bleeding** (menorrhagia or metrorrhagia), uterine leucorrhoea or chronic congestion, use the galvanic current, positive pole in uterus, strength of current 20 to 50 m. a., duration five to ten minutes, and repeat once a week or twice a week or every other day as necessary.

b. For **amenorrhoea,** scanty menstruation, poorly developed uterus, atonic conditions of uterus or vagina or pelvic floor muscles or sphincter ani (when repaired after long non-use) or sphincter vesicae (when weak from damage in parturition or other cause), use the galvanic current, negative pole in uterus, strength of current 20 to 50 m. a., duration five to ten minutes, and repeat once a week or twice a week or every other day as necessary.

Use faradic current, primary current and negative pole in uterus.

Use faradic current, primary current and negative pole in vagina.

Use faradic current, bipolar application in uterus or vagina.

In all cases be very careful to exclude pregnancy before using this treatment. When treating for atony of the sphincter ani and accessory muscles, the vaginal electrodes may be used as rectal, the active portion of the electrode being placed so as to direct the current through the affected muscles. When treating for imperfect control of the urine, the intra-uterine electrodes may be used as urethral.

c. To overcome **stenosis** of cervical canal, use galvanic current, negative pole, strength of current 5 to 10 m. a., duration 10 to 20 minutes and use twice, with a 3 to 5 day interval, just before the menstrual time, when no chance of pregnancy. The electrode is introduced to the stenosis and then the current turned on gradually. The effect of the negative pole is to cause congestion and softening of the tissues. The electrode is kept gently pressed against the area. It gradually advances as the tissues in front of it soften.

d. To relieve **pain** due to dysmenorrhoea, chronic pelvic inflammation or congestion, use the positive pole in the uterus or vagina with galvanic or faradic current. Also faradic bipolar application with secondary current. If due to anemia, poor development or poor functional activity, use the negative pole in uterus or vagina with galvanic or faradic secondary current. Also faradic bipolar application in uterus or vagina with secondary current. If without distinct local lesion, i. e., coming under the class styled neuralgic, try the different methods. The faradic bipolar application with secondary current is especially effective in relieving localized pain, when the electrode can be brought close to the painful area. The advice to try the different methods is applicable, in a measure, in nearly all applications of electricity to gynecological treatment, when the method first used does not produce the desired result. Each case is to some extent, a "mixed case," i. e., there are several separate, and sometimes opposed, factors at work and it is often difficult to say which is the predominating one.

e. For **excision** or destruction of tissue, such as small condylomata about the external genitals, caruncle about the urethra, persistent erosion about the cervix, small cervical cysts, cervical polypi, etc., the cautery is employed. Use the cautery-knife for excising papillomata and puncturing cysts, and the cone-shaped cautery-point for searing areas requiring such treatment. If on a sensitive surface, as on the external genitals or on the vaginal wall, apply a 20 per cent. cocaine solution or inject a ½ per cent. cocaine solution at the base of the involved tissue.

II. The desired effect should be obtained with as **little local disturbance** as possible—that is, in a case where the desired result can be obtained by dorso-abdominal applications (as in some cases of general pelvic pain due to chronic pelvic inflammation, pelvic neuralgia, etc.) these should be used in preference to vaginal or intra-uterine applications, especially in the case of unmarried women. On the same principal, an intra-uterine application is not used when a vaginal application will suffice.

Furthermore the **strength** of the application should not be such as to cause pain, the limit for that particular patient being found by gradual increase of the current strength by means of the controller (rheostat). Start with a very slight current, barely enough to move the indicator, until it is seen that everything is working smoothly. Then increase very gradually as the patient becomes accustomed to the current. This special care to give not the slightest discomfort is particularly important at the first application, as some patients are very uneasy when under treatment by electricity until it has been demonstrated to them that there is no pain or shock.

The **duration** of the application should not be sufficient to cause fatigue or much subsequent irritation, the usual duration being 10 to 20 minutes.

The **frequency** of the application varies very much in different cases. The milder application may be made twice a week or every other day or even every day for special indications. The stronger currents should be applied less frequently, as once a week or every ten days or two weeks.

12. Strict attention should be given to **cleanliness.** The electrodes for internal use (intra-uterine, vaginal, urethral, rectal) are sterilized and used under the same strict precautions as other instruments for the same localities.

13. Remember that electricity is **not a cure-all.** It is only one of our many resources. Some affections in some patients are benefitted by it. Many are not benefitted. Our duty in each case of disease is to cure the patient, or give her relief, by the safest and most effective means. Consequently in those cases where electricity promises the best results it should be given a thorough trial, but in those cases for which we have better means no time should be wasted with it.

CERVICAL DILATATION.

The thorough dilatation under anesthesia which precedes curetment is considered in chapter VI.

Partial dilatation in the office may give considerable relief in cases of dysmenorrhoea and it is used also in the treatment of sterility. The methods of making partial dilatation are given in chapter I and in chapter XIV.

VACUUM TREATMENT.

Suction has been applied to the uterine cavity by means of an apparatus fitting over the cervix and extending into the cavity. By means of a suction pump the uterine secretion is drawn out and a partial vacumn created, causing passive congestion of the endometrium. It is an application of Bier's "congestion treatment," which has been found so useful in certain general surgical affections. It has been used principally in the treatment of chronic endometritis. The reported cases show that the treatment must be long continued and the results finally secured are apparently no better, if as good, as those given by the more common and less tedious therapeutic methods.

APPLICATIONS WITHIN RECTUM.

ENEMATA, LOW AND HIGH.

The use of **low enemata** for emptying the rectum is so common and well known as to require no description. It may be well, however, to point out that in all painful affections of the rectum, an enema of two to four ounces of olive oil or sweet oil, with or without the addition of a pint of plain water, is preferable to the soap-water enema ordinarily employed.

High enemata are useful in several ways. Plain water or soap-water or medicated solutions are used in this way to secure bowel movement in obstinate cases. Normal saline solution is thus used after serious operations, to relieve thirst, to aid the kidney action and to sustain the heart. Various nutrient mixtures are used as high enemata to nourish the patient in certain classes of cases.

It is in the after-treatment of serious operative cases that high enemata are principally employed in gynecological work. The indications for their employment are given under After-treatment of Operative Cases (chapter XVI) and formulae for the same are given in the Appendix.

HOT WATER IRRIGATION OF RECTUM.

The use of hot water or hot saline solution in the rectum has been found useful in two classes of gynecological cases, first, those presenting a large mass of inflammatory exudate that resists absorption and, second, those presenting acute general peritonitis.

For Pelvic Exudate. In these cases the effect desired is the same as that sought by the long hot vaginal douche, namely, the long application of moist heat in the immediate vicinity of the mass of exudate. In some cases the hot water may be brought closer to the mass and made more effective by rectal irrigation than by vaginal irrigation. The rectal douche must differ, however, in some particulars from the vaginal douche. On account of the sphincter ani muscle, a double irrigating tube should be used. Again, the rectal mucosa is easily irritated and, furthermore, it is an absorbent surface, hence no strong antiseptic solution is permissible there. The irrigating fluid should be simply plain water or normal saline solution.

For Sepsis. Here the effect desired is absorption of the saline solution into the general circulation, for aiding the kidneys and heart, and also to some extent absorption of the saline into the peritoneal cavity and out with the drainage, instead of absorption of septic material from the cavity into the general circulation. For details, see Treatment of Acute Pelvic Inflammation (chapter X).

APPLICATIONS TO THE LOWER ABDOMEN AND INTERIOR OF PELVIS.

PELVIC MASSAGE.

Pelvic massage is the application of the principles of massage to the intrapelvic structures.

The effects to be attained are:

Correction of displacement of the uterus, tubes and ovaries.
Stretching of adhesions and infiltrated tissues.
Improvement of pelvic circulation (lymph and blood).
Absorption of chronic exudates.

Details of Application.

I think the best way to introduce this important therapeutic method is to consider it as a continuation of, or addition to, the ordinary bimanual examination.

When there is displacement of the uterus, with or without adhesions, the bimanual examination, by which the diagnosis is established, has also a therapeutic value.

Take, for example, a case of retrodisplacement in which the uterus can be brought forward but will not stay there. By bringing the uterus forward in the bimanual examination, the diagnosis of movable retrodisplacement is established. Then search is made to discover why the uterus will not stay forward. Suppose it is found that the anterior vaginal wall or vesico-vaginal septum is shortened, as sometimes happens. Whether this is a primary or secondary change is not of so much importance as to the fact that it exists, and constantly keeps the cervix so far forward that the fundus uteri tends to go backward. Of course, when in the bimanual examination the fundus is brought forward, the cervix is pushed backward and upward and the fundus is at the same time bent forward over the tips of the examining fingers in the anterior fornix, to take out any flexion in the body of the uterus.

Now, if instead of ceasing this intra-pelvic work as soon as the diagnosis is established, we continue to stretch the shortened vesico-vaginal septum, a decided therapeutic effect tending to permanent correction of the displacement is secured. The contracted tissues anterior to the cervix are made tense and stretched even up to the point of painfulness, and we endeavor all the time to place the cervix farther back in the pelvis as the tissues gradually yield. Force sufficient to damage the tissues or cause severe pain should not be used, the object being to gradually lengthen the tissues as much as possible without damage. In doing this we perform one of the important manipulations of pelvic massage, namely, **stretching.** This stretching may be done with the vaginal fingers alone, but the holding of the fundus uteri well forward at the same time, with the fingers of the abdominal hand, makes it more effective. There may be a restricting band running obliquely toward one obturator foramen, or transversely toward the pelvic wall in the base of the broad ligament. Whatever the direction of the band, it is to be stretched.

This process of stretching is somewhat painful and may be followed by a sense of fullness and pain in the stretched structures. It has been found by experience that these discomforts are diminished and the softening and stretching of the tense tissues facilitated by sweeping pressure, so directed as to work the lymph and venous blood out of the tissues toward the pelvic wall. This permits the more rapid entrance of fresh blood and hastens the absorption of serous and cellular infiltration. This sweeping pressure is applied by the finger-tips or the knuckles of the abdominal hand, worked far down into the pelvis to the tissues under treatment. The fingers of the abdominal hand depress the abdominal wall to the affected tissues, which tissues are, at the same time, raised as much as possible by the vaginal fingers. The infiltrated tissues are now compressed between the vaginal and abdominal fingers. The abdominal fingers, still keeping up the pressure, are made to describe a small circle or ellipse. In the lower part of the circle, which lies directly over the tissues under treatment and where the direction of movement is from within outward, the strong pressure is made. In this movement, the abdominal fingers remain at the same spot on the skin. This is essential for, if the pressure is relaxed enough to allow the fingers to slip over the abdominal surface, no deep effect can be obtained. The skin is freely movable over the deeper structures of the abdominal wall, and one point can easily be carried through the small circle described. In some cases, where the abdominal wall is very thin and lax, the whole thickness of the wall may follow the fingers to some extent. The vaginal fingers are not moved in the least. They remain perfectly stationary, being required only to elevate the infiltrated area so that it can be subjected to compression by the fingers above. The application of this sweeping pressure, as just described, constitutes that other important manipulation of massage known as **kneading.**

These two manipulations, STRETCHING and KNEADING of shortened and infiltrated tissues or of adhesions, constitute the essentials of pelvic massage in ordinary cases. Whether the infiltrated area or the tense band is at the lower part of the broad ligament or the upper part, whether it binds the uterus backward or forward or laterally or holds an ovary or tube in abnormal position, the principles of manipulation are the same, namely, to stretch the adhesions or shortened tissues and to work the lymph and venous blood out of them towards the pelvic wall. The clothing must be well loosened so that there is no constriction forcing the intestines into the pelvis. The bladder and rectum should be empty—therefore direct the patient to take an enema an hour or two before coming for treatment and to empty the bladder just before treatment.

The manipulations must always be gentle at first, gradually increasing in force as the tenderness diminishes. Painful points should not be passed over directly or carelessly but circled about and approached gradually.

As to the length of the seance and the frequency of repetition, the physician is guided by the conditions present and the effect produced. The idea is to stretch the tissues and remove infiltration as quickly as possible, but if too much force is used or the seance made too long the resulting irritation may increase rather than diminish the infiltration. The treatments should be far enough separated so that the irritation from one, as evidenced by pain and soreness, has largely subsided before the next is given. This, of course, will vary much in different cases. A seance of five or ten minutes repeated from every second day to every other week, are about the requirements. The cases must be carefully selected, and if no decided benefit is apparent after a few treatments, they are stopped and more effective measures employed. Of course, other measures are to be used in conjunction with this treatment as indicated—general measures, internal treatment, hot vaginal douches, pessaries, etc.

Indications for Pelvic Massage.

Pelvic massage is of benefit principally in cases of uterine displacement accompanied by the sequelae of a pelvic cellulitis (real parametritis) or by old peritoneal adhesions without active pelvic inflammation. It is useful also in some cases of the same connective tissue or peritoneal inflammatory sequelae without important displacement of the uterus, the improvement in these cases being due probably to the removal of cellular infiltration and stasis-edema of the tissues, the relief from pressure of constricting peritoneal bands and the improvement of the lymph and blood circulation in the pelvis. It is useful also in exceptional cases of a persistent large mass of exudate, but only where all active inflammation has disappeared and nature has failed to make the usual prompt removal of exudate when it is no longer needed for limiting purposes.

Inflammation of the **connective tissue** in this region, as in other regions, runs its course rather rapidly, ending in resolution or in the formation of an abscess which is opened or opens itself. In either case the active inflammation soon subsides, leaving no persistent focus of active inflammation, but only the sequelae, consisting principally of scar tissue and cellular infiltration and the circulatory disturbance of lymph and blood resulting therefrom. These are just the conditions most susceptible to improvement by massage. Furthermore, in this condition comparatively little can be accomplished by operative work. There is no focus of persistent inflammation to be excised, no intra-peritoneal mass of exudate to be removed, no intra-peritoneal bands to be broken. The cellular infiltration and the bands of scar tissue lie under the peritoneum among important vessels and nerves and other structures, and are of such nature and so situated, that their excision is not, ordinarily, desirable nor practicable.

Allied to these cases, as regards their suitableness for massage, are the cases of retrodisplacement without infection in which the persistence of the displacement seems to be due, to considerable extent at least, to a shortening of the upper posterior part of the broad ligament. This is found in certain troublesome cases of retrodisplacement in women who have never been pregnant. It constitutes the cause of failure in some cases submitted to the ordinary operative procedures for retrodisplacement. It is not effected by such measures unless the involved tissues are directly divided or over-stretched at the time, and this must be done carefully or important structures will be injured. In some cases this contraction is hardly appreciable during the operative work, the uterus coming forward without much resistance, but the constant slight pull maintained by this tense tissue is sufficient to gradually draw the uterus back again into retrodisplacement. In cases of retrodisplacement, the intra-pelvic conditions should be carefully studied by bimanual examination, to determine just what holds the uterus backward or what causes it to go backward after replacement.

On the other hand, when an infectious process attacks the **Fallopian tubes** there is liable to remain a focus of persistent inflammation, the same as there does in the appendix. It may be walled off so as to remain in a measure quiescent for weeks or months at a time, but every once in a while it is stirred up by extra exertion or some other circumstance that increases the local irritation or diminishes the local resistance. It is evident that in such a condition (salpingitis), stretching or kneading of the involved tissue would only cause an increase of the inflammation and of the resulting exudate and disturbance. The proper treatment in such a case is to remove the focus of persistent inflammation, and this is accomplished by the removal of the diseased tube or ovary and, as far as practicable, of the accompanying peritoneal exudate.

Just a word as to the term "parametritis," for it looms up large in nearly all articles on pelvic massage. The connective tissue about the uterus and extending out into the broad ligaments and sacro-uterine ligaments, is often spoken of collectively as the "parametrium"—a very convenient term, for it is much shorter than "pelvic connective tissue" or "peri-uterine connective tissue," with which it is synonymous. Inflammation of the connective tissue about the uterus (pelvic cellulitis) is often spoken of as "parametritis." So far so good, for this also is a convenient term, but with its extended use, confusion has crept in. In the first place, it is very similar in sound and appearance to the term "perimetritis," which means inflammation of the tissues around the uterus, more especially, however of the peritoneum and adnexa (tubes and ovaries). So, even with a perfectly clear idea of the limitation of parametritis, it may be confounded by the hearer or reader with the very similar sounding and appearing word "perimetritis," which means almost the opposite. In the second place, the term parametritis is used loosely by some writers and speakers, which has led to ambiguity and much difference of opinion as to the efficiency of pelvic massage and other methods of treatment in pelvic inflammatory troubles. There seems to be a tendency to apply the term parametritis to every thickening or induration around the uterus. This is inexact and leads to misunderstanding and confusion. If persisted in to any great extent, it will necessitate the dropping of this very useful and convenient term. In speaking to my classes I usually employ the less convenient term "pelvic cellulitis," because only one meaning can be attached to it.

In regard to pelvic massage, so much has been claimed for it and on the other hand so much has been said against it, that the beginner is very liable to be misled by one sided reading or confused by the vigorous promulgation of conflicting views. The markedly denunciatory statements indulged in on each side are in many cases the result of one-sided experience. One physician prefers operative treatment, uses it exclusively and denounces massage, about which he knows little or nothing. Another physician favors massage, uses it exclusively and denounces operative treatment, about, which he knows little or nothing. Of course, such a state of affairs should not exist, but the fact remains that it does exist, not only in regard to this subject but also in regard to other important subjects. It is so flattering to one's vanity to give a sweeping opinion on a subject of importance and so easy to find auditors, that many persons make broad statements without proper thought and investigation. Such opinions are of course worthless, but the fact that they are worthless is often not known to those who hear and read them, and the situation is thus complicated and the truth obscured. Differences of results and consequently differences of opinion will always exist on account of differences in physicians and patients, but we should always be ready to consider a subject in a rational way and without prejudice. Persons and conditions vary so much and there are so many sources of error that we must advance cautiously from the well established to the comparatively unknown. When however a method of treatment is, from its demonstrated effect, rationally applicable to a known pathological condition, and hundreds of thoroughly reliable physicians in various parts of the world have secured good results by practical application of the method, there is no reason why it should not be used where the necessary skill and discrimination can be obtained. A method is not condemned because some have employed it as a cure-all, when in fact it is applicable to only a small proportion of the conditions met with, or because some have used it in conditions where it was contra-indicated and have thereby done harm, or because some who were unworthy the name of physician have used it as a cloak for criminal practices, just as the same or similar creatures have used other well-established therapeutic measures.

Pelvic massage has its strict indications and contra-indications, just as has every other therapeutic measure. Its application requires much discrimination in the selection of cases and much skill in the pelvic manipulations and then a large fund of patience and perseverence. Used with skill and care in conjunction with the other measures, it has, in certain conditions already indicated, restored the patient from a condition of chronic invalidism to health, and to a condition much nearer anatomical and physiological cure than could have been secured by a cutting operation. In other cases the patient is not cured, but the intra-pelvic condition is so far improved that she is made fairly comfortable and able to get along. In still other cases it does no good and is a waste of time, and serves to postpone the employment of measures that would be effective in restoring the patient's health.

Contra-Indications to Pelvic Massage.

When there is marked tenderness or where there is marked hyperesthesia of the pelvic organs or of the vagina or of the external genitals, pelvic massage is contra-indicated. It is contra-indicated also in the presence of:—

Acute inflammation.
A collection of pus.
Active salpingitis.
Pelvic tuberculosis.
Malignant disease.
Pregnancy.

PRESSURE TREATMENT.

The effects sought by pressure treatment are (a) to hasten the absorption of a chronic exudate in the pelvis, (b) to assist in stretching adhesions or infiltrated tissues and (c) to assist in raising a displaced uterus.

The articles required are (a) two strong colpeurynters connected by a stop-cock, (b) two pounds of mercury, (c) bag of fine shot weighing three pounds, with an elastic bandage for fastening same to the lower abdomen. The empty colpeurynter is introduced into the vagina, the patient's hips elevated, the shot-bag applied to the lower abdomen, and the mercury run into the vaginal colpeurynter in sufficient quantity to make the desired pressure.

Details of Application.

The bladder and rectum must be empty. With the patient in the dorsal posture on a bed or table, one colpeurynter (detached from the other and empty) is cleansed, lubricated, folded, grasped with a uterine dressing forceps and introduced to that portion of the vaginal vault nearest the exudate. The patient then takes the position to be maintained during the treatment—on her back, if the exudate is behind the uterus, or on the side corresponding to the exudate if it is on one side of the uterus—and the shot-bag is placed on the lower abdomen and so fastened by a bandage or elastic belt that it will maintain the counter-pressure in the direction of the exudate when the patient's hips are elevated. The foot of the bed is then raised about eighteen inches and the hips are still further elevated by one or two folded pillows placed under them. The other colpeurynter, containing the two pounds of mercury, is connected with the colpeurynter tube extending out of the vagina and the stop-cock is opened sufficiently to permit a small stream of mercury to flow into the vaginal colpeurynter at the vaginal vault. From one to two pounds of mercury is allowed to flow into the vaginal colpeurynter, depending on the absence of pain. There should not be enough pressure to cause much pain.

The treatments are given daily and at first should not last more than half an hour, to be soon increased to one hour. Later, if well borne, the treatment may be kept up for several hours at a time—in fact, may be continued the greater part of the day with intervals of rest.

Indications and Contra-Indications.

Indications. Pressure treatment is applicable principally in cases of adherent retro-displacement of the uterus and in cases of chronic pelvic inflammation in which the exudate is in the cul-de-sac of Douglas or in the broad ligament or in which there are adhesions low in the pelvis.

Contra-indications. When the exudate is situated high, above the fundus uteri or about the tubes, this treatment is not satisfactory.

When severe pain is caused by the pressure, the treatment must be discontinued, as there is danger of starting up active inflammation or disseminating an unrecognized focus of active infection. It is contra-indicated also in the presence of:—

Acute inflammation.
A collection of pus.
Active salpingitis.
Pelvic tuberculosis.
Malignant disease.
Pregnancy.

APPLICATIONS TO BODY GENERALLY.

BATHING.

Regular bathing for hygienic purposes is necessary to keep the patient in good general health. Also hot baths or cold baths may be required for their special effect on the patient's nervous system.

The hydrotherapeutic methods particularly useful in gynecological cases (vaginal douches, moist applications to lower abdomen, sitz baths) have already been described.

FRICTION RUBBING.

Friction rubbing of the general body surface with alcohol or salt or a brush or a rough towel, which the neurologists have found so extremely useful in atonic conditions of the nervous system and of the body generally, is often indicated in gynecological cases. The fact that the patient is under treatment for some pelvic disease should not prevent her receiving such other treatment as is necessary. After operation for pelvic disease which has caused marked deterioration of the general health, it is important to employ general measures in conjunction with the local measures in order to complete the restoration to health.

The detailed consideration of these various general measures would take up too much room and would be somewhat out of place in a work of this character. I must content myself with calling attention to the importance of their intelligent use in gynecological cases.

GENERAL MASSAGE.

General massage also is invaluable in the treatment of certain conditions of physical depression caused by or associated with pelvic disease. The cases referred to are those in which the vital forces are apparently "wornout" by long suffering, chronic septic absorption, antointoxication or faulty metabolism. The object is to produce a general tonic effect upon the muscular, circulatory, nervous, digestive, respiratory and execretory systems.

General massage, like other general measures, belongs to general medicine and its description is not called for here.

Pelvic massage has already been considered.

DRESS CORRECTION.

It is not my purpose to take up in a general way the subject of dress as it relates to health. I want simply to mention two things that have a bearing on the treatment of pelvic disease.

1. Constriction at the waist. By this constriction the abdominal contents are forced downward towards the pelvis, and thus the pelvic contents are subjected to abnormal pressure. This abnormal pressure interferes with the circulation in the various pelvic organs, causing poor nutrition and chronic congestion.

This injurious pressure helps to bring about the following abnormal conditions. In the young woman, the nutrition may be so interfered with that perfect development is not attained. In the adult, the chronic pressure and congestion tends to cause chronic endometritis, displacements of the uterus and chronic irritation and enlargement of the ovaries. Following parturition, the persistent congestion tends to cause subinvolution and chronic endometritis. In laceration of the pelvic floor, the pernicious effects of the laceration are much increased by the constant strong downward pressure of the abdominal contents. In retrodisplacements of the uterus, the fundus uteri is forced still further into the abnormal position by this downward pressure from above, and the ovaries also are forced down beside the displaced uterus. In prolapse, the structures are constantly forced further and further out of the pelvis and, in addition, there is caused a general splanchnoptosis. This tendency of waist constriction to cause permanent displacement of various abdominal organs, adds many abdominal symptoms to those of the pelvic disturbance.

2. Dragging weight at the waist line. To support heavy skirts by means of a string tied around the waist is fully as injurious as the wearing of the average corset. The heavy skirts drag down the abdominal organs towards the pelvis and produce injurious pressure on the pelvic organs.

To prevent these injurious effects, all constriction should be removed from about the waist and the clothing should be supported from the shoulders, as has been insisted upon so strongly by those who have given much careful study to the relation of the clothing to bodily health, strength and beauty. This is advisable in well persons, but is imperatively important in those suffering with pelvic disorders. Any "corset" or "support" or "stay" that is used, should make no firm constriction above the iliac crests. Some are so arranged that they not only cause no waist-constriction, but really give some support to the lower abdomen and hence are beneficial in cases requiring support.

POSTURAL METHODS AND EXERCISE.

KNEE-CHEST POSTURE.

The patient supports herself on the knees and chest (Fig. 468). The head rests on a pillow, with the face turned to one side, and the breasts are brought as closely as possible against the table. The clothing must be well loosened about the abdomen. The thighs should be vertical. Unless particular attention is given to the latter point the patient's hips will be too far forward or too far backward, thus

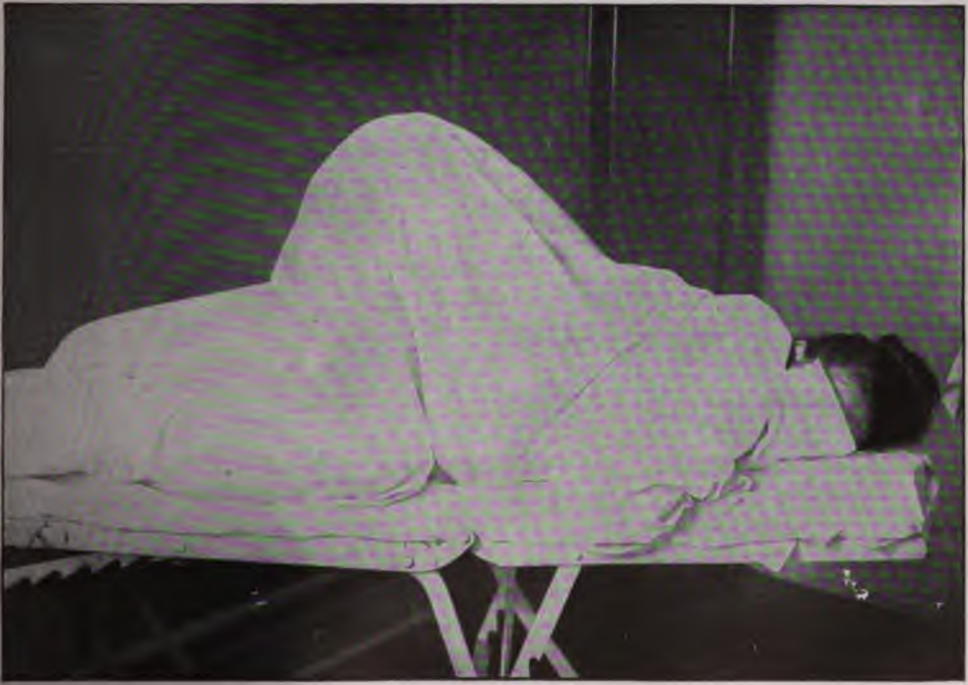

Fig. 468. The Knee-chest Posture. The thighs should be perpendicular and the breasts should be brought against the table. All constriction about the waist must be removed.

losing a large part of the desired elevation. This position may be maintained for from one to ten minutes.

The effect of this posture is to temporarily take all downward pressure off the pelvic organs and permit them to gravitate toward the abdominal cavity (Fig. 469). The downward pressure on the pelvic organs is for the time being relieved, the local circulation is greatly improved and a movable retrodisplaced fundus uteri tends to gravitate forward towards the normal position. The effect is much

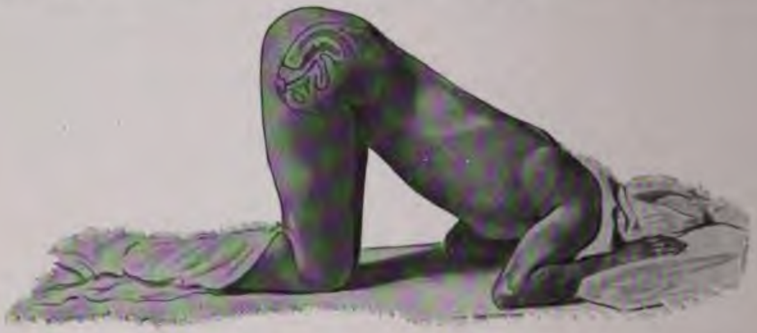

Fig. 469. The Knee-chest Posture, showing the pelvic structures in outline and illustrating the tendency of the uterus and adnexa to gravitate forward. (Montgomery—*Practical Gynecology.*)

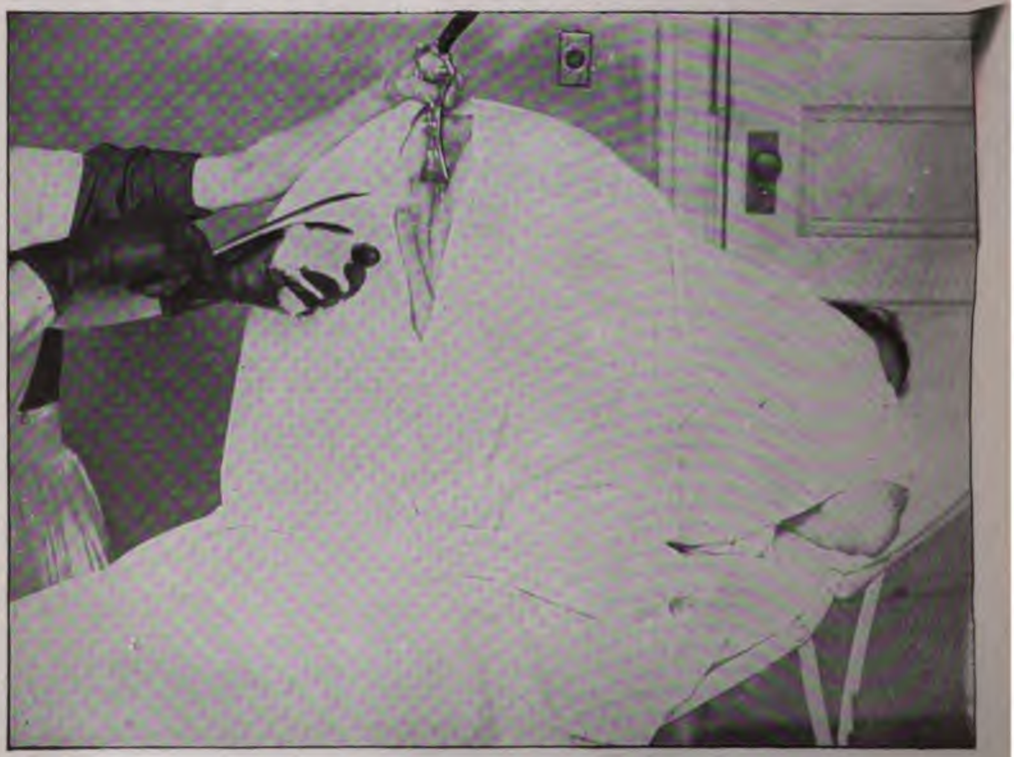

Fig. 470. The Knee-chest Posture, with the patient draped ready for packing or other treatment.

increased if the vagina be opened with a speculum or with the fingers so that air may enter.

Indications for Knee-Chest Posture.

The knee-chest posture is used **in office treatment** for the following purposes:

To assist in replacing an ordinary movable retrodisplaced uterus.

To assist in replacing a pregnant retrodisplaced uterus.

To assist in pushing a tumor, impacted in the pelvis, back into the abdominal cavity.

To assist in replacing a vaginal hernia.

To hold the uterus as near as possible to normal position while introducing a vaginal tamponade, for retrodisplacement or for prolapse.

Fig. 470 shows the patient in the knee-chest posture and draped with the sheet for treatment.

The knee-chest posture is used by the patient **at home** as an aid in the treatment of the following conditions:

Retrodisplacement, especially when the uterus can not be entirely replaced or shows a tendency to return to the backward position.

Downward displacement of the pelvic organs, from laceration of the pelvic floor or from beginning prolapse or from simple relaxation and intra-abdominal pressure.

The venous congestion and consequent heaviness of the organs is for the time being relieved and the beneficial effect is sometimes noticed for hours afterward. The patient is directed to take the posture ordinarily for one or two minutes twice daily. Usually the most convenient time is while in bed, just after retiring in the evening and just before rising in the morning.

TRENDELENBURG POSTURE.

In the Trendelenburg posture the hips are elevated as shown in Fig. 471. The elevation of the hips may be moderate or extreme, as required by the particular case. This posture is used principally in operative work, though it is sometimes useful in diagnosis and in minor gynecologic treatment. It is employed in the pressure-weight treatment previously described, in pelvic massage in certain cases where it is important to get the intestines out of the pelvis, and also in cases where it is desired to employ gravity in moving an abdominal or pelvic organ upward towards the abdominal cavity but in which the patient can not take the knee-chest posture.

EXERCISE.

General Exercise. Exercise in the form of walking, horse-back riding, driving, outdoor games and general gymnastic movements (both outdoors and indoors) may be required in patients presenting pelvic disturbance depending on depression of the general health, particularly in certain forms of amenorrhoea. These measures are used however almost exclusively for their effect on the general health, and the description of the details of their application belongs to general medicine.

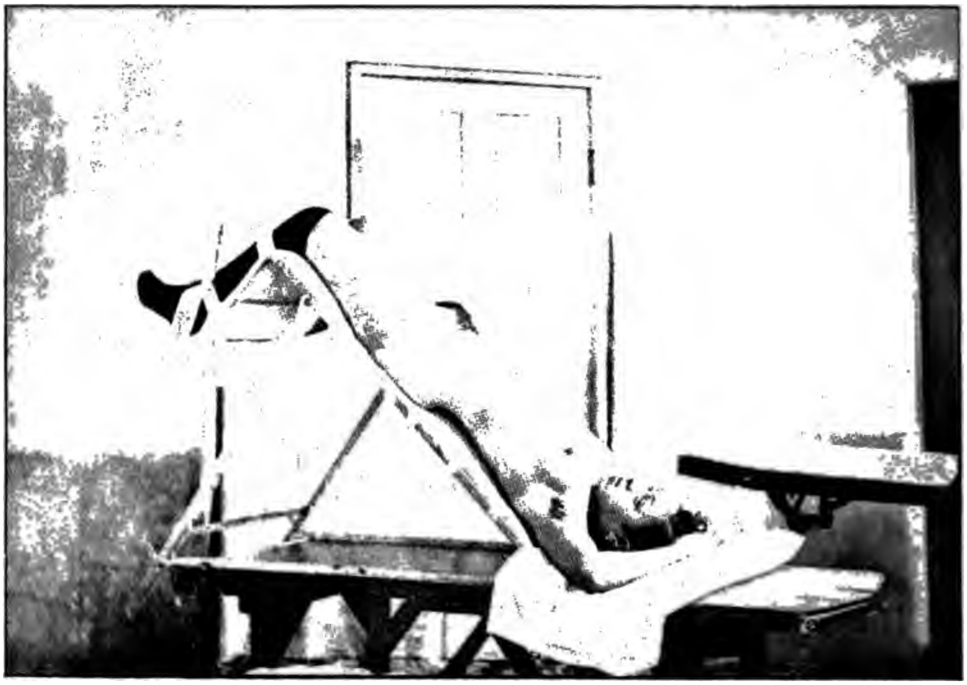

Fig. 471. Trendelenburg Posture, with the subject uncovered to show the exact arrangement. The elevation of the hips is sufficient to cause the abdominal and pelvic structures to gravitate toward the diaphragm. (Baldy—*American Text-book of Gynecology.*)

Special Exercise. There is one useful and simple procedure that is particularly applicable to certain gynecological patients. I refer to voluntary contraction of the muscles of the abdominal wall. This is one of the most effective measures that can be employed in the treatment of that affection which is so distressing to many women, namely, prominence of the abdomen from relaxation of the wall. This is seen principally following confinement, the overstretched abdominal muscles (overstretched from the pregnancy) having never regained their tone.

The exercise consists in the patient raising the head and shoulders while she is lying on her back. The arms should be crossed over the chest and the head and shoulders raised by the abdominal muscles alone. Once or twice daily the patient goes through this exercise, raising the shoulders ten to twenty times at each exercise. As the recti muscles become strong, the movement may be varied somewhat to the side in order to bring into action the lateral abdominal muscles.

INTERNAL TREATMENT.

Internal treatment may be in the form of medicines or of diet or of psychotherapy.

MEDICINES.

Internal medication affects pelvic lesions principally in an indirect way—by improving the quality of the blood supplied to the pelvic organs, by relieving congestion and bettering the pelvic circulation, by toning up the nervous system, etc. These indirect effects, however, are often of decisive importance. The formulae of the various preparations particularly useful in gynecological cases are given in the Appendix.

I wish here to call attention to certain classes of internal remedies that are often indicated in the treatment of patients with pelvic disease.

1. Uterine Astringents. To this class belong ergot, stypticin and hydrastis. Ergot causes contraction of involuntary muscular tissue. The uterus is composed principally of such tissue, consequently ergot and allied substances have a marked tonic effect on the uterine wall. The relaxed and dilated uterine blood vessels are narrowed, the chronic congestion is relieved and the tendency to inflammatory infiltration diminished.

This class of remedies is beneficial in all conditions of chronic uterine congestion and hemorrhagic tendency, except those connected with pregnancy.

2. Laxatives. It is difficult to appreciate the full value of laxatives in the treatment of patients with pelvic disease until the marked benefit due to them becomes a matter of personal observation through years of experience. The intelligent and systematic use of saline purgatives in acute inflammatory conditions and of the milder laxatives (cascara sagrada, etc.) in chronic pelvic disaeses is one of the greatest aids in restoring the organs to their normal condition, where such restoration can be accomplished by minor measures, and in preparing the structures for successful operative work in the cases where operation is necessary. A constantly loaded rectum and colon chokes the pelvis mechanically, causes chronic pelvic congestion, both by direct pressure and by irritation and also by contributing to an atonic condition of the pelvic tissues, and depresses the general health by auto-intoxication from the intestinal contents.

3. Sedatives. In various conditions sedatives are required, either on account of local pain or because of marked general nervousness. The various preparations in common use are given in the Appendix. In ordinary pelvic distress, consisting of a mixture of pain and pressure and fullness, the preparations containing viburnum prunifolium usually give some relief. If there is simply general nervousness and sleeplessness, sodium bromide is effective. If there is associated bladder irritability, hyoscyamus in combination with potassium citrate or other alkaline tends to lessen the vesical tenesmus. When there is severe pain, stronger analgesics are required, for example, codeine in combination with phenacetine, and if there is still no relief it may be necessary to give morphine. The latter, when given at all, should be given in such form that the patient does not know what she is taking. For that reason it is preferable to give it in a capsule in combination with some indifferent substance rather than in the usual small tablets, the contents of which are at once surmised by most patients.

4. Tonics. Tonics containing iron are, of course, indicated in anemic patients, and it is usually advisable to give also some one or more of the general tonics, such as strychnia, quinine, arsenic, etc.

5. Organo-therapy. The use of animal extracts or dessicated tissue from various glands, has not proven of as much value in gynecological cases as some at first hoped for. However, the administration of dessicated ovarian tissue or corpus luteum tissue is undoubtedly of value in a large proportion of the cases of destruction of the ovaries by operation or disease. Also, in some cases of excessive nervous disturbance during and immediately following the natural menopause, it has given marked relief after other measures failed. In order to secure the desired effect the remedy must be given continuously over a period of several weeks or months.

Thyroid extract administered in cases of fibro-myoma, while it has led to some remarkable reported effects, is on the whole probably not as effective as ergot in when the latter is given with the same care and persistence.

6. Serum Therapy. In various infective processes much good may be accomplished by the injection of bacterial products which inhibit the growth of the corresponding bacteria. The most striking and certain effects are seen in the cure of diphtheria by diphtheria antitoxin and the prevention of tetanus by antitetanic serum.

Antistreptococcic serum in its various modifications has proven beneficial in cases of puerperal infection and other forms of streptococcus infection and of mixed (staphylococcus and streptococcus) infection. In some cases the effect is very pronounced, apparently saving the patient's life, while in other cases there is apparently no effect.

It is worthy of a thorough trial in severe cases, as explained under Acute Pelvic Inflammation (see chapter x.).

Opsonic Treatment. The object of this treatment is to increase the destruction of invading bacteria by the white blood-corpuscles (leucocytes).

The power of the leucocytes to take in and destroy bacteria (phagocytosis) has long been known, through the investigation of Metchnikoff. Within the last few years much additional information regarding phagocytosis has been acquired. Various facts have been brought out by different investigators, but it is largely through the work of A. E. Wright, of England, that the subject has been developed to the point where a definite therapeutic method has resulted.

The essential features of the opsonic theory and treatment may be summarized briefly as follows:

a. Leucocytes, freed from the serum and mixed with bacteria, have no phagocytic power. When blood-serum is added to the mixture, phagocytosis begins. This difference is due to some substance in the serum that combines with that particular class of bacteria, and prepares the bacteria for ingestion by the leucocytes. This is designated as an "opsonic" effect (from opsono—I cater for or prepare food for), and the substance that thus prepares the bacteria is called an "opsonin."

b. The opsonic power of a patient's blood-serum, for the particular bacteria causing the illness, may be definitely measured by bacteriologic methods. This is then compared with the opsonic power of the blood-serum of a normal individual for the same bacteria. In this way is secured the "opsonic index" (relative opsonic power) of the patient's blood.

c. When the opsonic index is low (poor resistance to the invading bacteria), it may be increased by the subcutaneous injection of devitalized cultures of the infecting organism. The toxic principle contained in the bacterial bodies, when brought in contact with the blood-serum, increas serum for that particular kind of bacteria. Thus the opsonic index of the patient's blood may be raised to normal, and then the growth of the infecting microorganism is checked and the lesion heals.

As more knowledge was acquired concerning the effects of this vaccine treatment, it was found possible to satisfactorily guide the treatment by the clinical symptoms instead of depending on the opsonic index, the determination of which required a skilled pathologist and a laboratory. This increased the field of employment of this treatment very much, and it is now extensively used in various infections. Another important step in extending the usefulness of the vaccine treatment was the manufacture and marketing of stock vaccines almost as effective as autogenous vaccines. These are put out by different reliable firms under different names, and this enables the physician to use this remedy promptly, without the delay and expense incident to the manufacture of autogenous vaccine. However, in particularly resistant cases it is well to fall back on the autogenous vaccine.

7. **Special Medication.** In many patients with pelvic disease there are complicating or associated disturbances that require treatment, such as disease of the stomach, liver, lungs, kidneys, etc. Care should be taken that such coincident affections be not overlooked for they, as well as the pelvic lesion, must receive proper treatment in order to restore the patient to health.

DIET.

A comprehension of the principles of proper diet and an intelligent employment of the same is necessary in overcoming malnutrition and in rescueing patients from the depraved general health occasioned by certain pelvic diseases. In this connection, however, the diet has to do primarily with the general nutrition and only remotely with the pelvic lesion. The principal way in which the details of diet enter directly into the treatment of pelvic lesions is in the aftercare of operative cases, consequently, such details of diet as I think best to take space for will be given in chapter XVI.

PSYCHO-THERAPY.

Many nervous affections require psycho-therapy, such as competent and discriminating neurologists are using more and more. This subject has been carefully investigated in recent years by reliable physiologists and clinicians, and methods of treatment have been worked out which, in conjunction with necessary medication or operative measures, will greatly has ten the cure in many cases, and will restore to health some patients otherwise incurable.

OPERATIONS.

Careful anatomical and pathological investigations have demonstrated that many pelvic lesions are of such nature and so situated that a cure can be effected by nothing short of operative treatment, with its direct handling of the diseased tissues and extirpation of the hopelessly damaged.

In some cases this is evident from the very nature of the lesion, as in the case of malignant disease and tumors generally. On the other hand, in many inflammatory lesions the question as to whether or not operative treatment will be necessary can be answered decisively only after nature, with the aid of minor measures, has been given a thorough trial. The operative measures indicated in the various affections will be mentioned in the appropriate chapters.

CHAPTER IV.

DISEASES OF THE EXTERNAL GENITALS AND VAGINA.

POINTS IN ANATOMY.

EXTERNAL GENITALS.

The external genitals (Figs. 42, 208), called also the vulva and the pudenda, include the following structures:

Mons Veneris.
Labia Majora.
Labia Minora.
Clitoris.
Vestibule.
Vulvo-vaginal Glands.
Hymen.

The **mons veneris** (Figs. 1, 3, 30) is simply a pad of subcutaneous fat lying over the symphysis pubis. The triangular area which it forms is covered with hair after puberty. The base of the triangle is represented by a slight groove at the lower limit of the hypogastric region, and the lower portion is continuous with the labia majora. Examination of a microscopic section through this region shows the usual characteristics of skin, i. e., many layers of squamous epithelial cells (the deepest being cubical and the most superficial being flattened and horny) placed on loose connective tissue, and presenting hairs, sebaceous glands and sweat glands. A little deeper there is much fat, which is penetrated and held together by fibrous septa that divide it into lodules. There are also many elastic fibers.

The **labia majora** (Figs. 42, 43, 208) are two cutaneous folds which extend, one on either side, around the vaginal opening. They are apparently continuations of the mons veneris and, passing backward, end by joining the perineum. The external surface of each labium majus presents the ordinary characteristics of integument. Each labium is limited externally by the genito-crural fold and corresponds to that side of the scrotum in the male. The round ligament, coming through the inguinal canal of each side, terminates in the upper part of the labium majus of that side. Sometimes a distinct canal remains open for some distance along the round ligament. This is known as the canal of Nuck, and through it a hernia may take place into constituting a labial hernia. This is known also as a pudendal hernia. ts may be intestine or omentum or ovary or even the uterus.

Occasionally the canal of Nuck is shut off from the peritoneal cavity, and the [illegible] thus formed fills with fluid, giving rise to pudendal hydrocele or "hydrocele of t[illegible]e canal of Nuck." The inner surface of each labium majus is smooth and of a pin[illegible]ish color. It has largely lost one of the characteristics of integument—the hairs—only a few fine hairs being found here.

In children the labia majora are very small and the labia minora project b[illegible]tween them. As puberty is approached the external labia become larger and me[illegible]et in the median line. At puberty they, in common with the mons veneris, becon[illegible]ne covered with hair. A little later in life, particularly in married women, the lab[illegible]ia minora become enlarged so much that they project forward, separating the lab[illegible]ia majora. In old age the labia undergo marked diminution in size and prominenc[illegible]e, the shrinking being due largely to absorption of the fat.

Microscopic examination of a section of a labium majus shows the same structur[illegible]s found in the mons veneris, the only difference being that on the inner surface [illegible]f the labium there are only a few hairs, and they are small. There are, however, many sebaceous glands. There are also, of course, the arteries, veins and other structures found in cutaneous and subcutaneous tissues. The connective tissue is rich in elastic fibers, and still deeper there is the thick deposit of fat that gives the labium its prominence. The veins are numerous and large, and become much distended when there is intra-pelvic pressure, as in pregnancy or a tumor. Under such circumstances, a wound of the labium may lead to serious and even fatal hemorrhage.

The **labia minora,** (Figs. 208, 212, 214), or nymphae, are two delicate muco-cutaneous folds lying between the labia majora, one on each side of the vaginal opening. Each labium minus apparently grows from, or is a secondary fold of, the upper and inner portion of the labium majus of that side. In stout women the nymphae are normally concealed by the labia majora. Ordinarily, particularly in married women, they project slightly. Frequently they are somewhat enlarged and project half an inch or more. The enlargement is usually not exactly symmetrical, and in some cases it is confined to one labium. In a valuable article on these enlargements of the labia minora, Dickinson upholds the idea that whenever the enlargement is marked it is proof of excessive irritation of the labium. It is stated that among the Hottentots, owing to certain treatment practiced in childhood, the labia minora often becomes excessively developed and hang like a thick apron between the thighs (Fig. 268). The labia minora begin just below the anterior junction of the labia majora as double folds which pass above and below the clitoris (Fig. 214). The folds that join above the clitoris form the prepuce of the same. The labium minus of each side then descends along the inner side of the labium majus and blends with labium majus about the junction of the middle and lower third. The posterior extremeties of the labia minora are united by a delicate fold which extends between them just within the posterior margin of the vulvar orifice, forming the fourchette. When the labia are separated, the fourchette is made tense and between it and the hymen is a small depression called, from its boat-like shape, the "fossa navicularis." This delicate fourchette is, except in rare cases, torn at child-birth, and in some cases is obliterated even by sexual intercourse. It is best seen in the virgin.

There has been much dispute as to whether the inner surfaces of the labia minora are covered by integument or mucous membrane. The covering presents some of the characteristics of each. It is a transional form of covering and represents one step in the several changes which take place from the labia majora to the external surface of the cervix. The outer surfaces of the labia majora are ordinary integument. On the inner surfaces of the same structures, the hairs are much reduced in size and number. On the labia minora, the hairs are absent, though the sebaceous glands are still present. On the vestibule, only a few glands remain and the thinning of the epithelium is more marked. In the vagina, all glands disappear (it being now generally held that there are no glands in the normal vagina) and the epithelium becomes thinner and the papillae less marked. Over the vaginal portion of the cervix the papillae have almost disappeared. So there is a gradual transition from ordinary integument, with a thick epithelial layer and hairs and sebaceous glands and sweat glands and marked papillae, to a thin epithelial layer without hairs or glands and almost without papillae. When the vaginal wall is turned out for a long time, as in prolapse, and exposed to friction by the clothing, the epithelial layer becomes much thickened, and if the surface is kept dry it becomes horny like the external integument.

The labia minora have many small folds, giving a very uneven surface. Examination of a section of a labium minus shows numerous epithelial depressions, owing to the much folded surface. The bands and nests of epithelial cells seen in such a section are simply oblique cuts of normal fôlds and ingrowths. The labia minora are very rich in blood vessels, especially veins, so much so that the structure partakes of the nature of erectile tissue. They are also rich in lymphatics and nerves.

The **clitoris** (Figs. 1, 208, 224, 488) is the analogue of the penis in the male, and is situated just below the anterior junction of the labia majora. It is a small erectile organ richly supplied with blood and nerves, and is attached to the sides of the pubic arch by its crura. In both the clitoris and the labia minora there are special nerve endings. Examination of a section of the clitoris shows the erectile nature of the structure. During sextual excitement the clitoris fills with blood and becomes swollen and firmer. It is supposed to be the most sensitive of all the genital organs to sexual contact, and on this account excision of the clitoris (clitoridectomy) was proposed and carried out for the relief of disturbances depending on sexual hyperesthesia, but the results were not such as to recommend the operation, and it is now rarely practiced.

The **vestibule** (Figs. 44, 208, 213, 214) is an elliptical area situated between the labia minora. The sides are formed by the labia minora, the anterior end extends to the clitoris, and the posterior end is formed by the junction of the labia majora. Into this vestibule four canals open—the urethra, the vagina and the duct of the vulvo-vaginal gland of each side. The urethral opening, the meatus urinarius, is situated just above the vaginal orifice (Fig. 214). In the nullipara it is small and round. In the multipara it is larger and somewhat star-shaped, and there is often some pouting or projection of the urethral mucosa. This change is due to the swelling and distortion during labor, from which the parts never return absolutely to their former condition. The floor of the vestibule is formed of several layers of squamous epithelium and under this the subepithelial connective tissue. There are a few glands, some of which at times become enlarged.

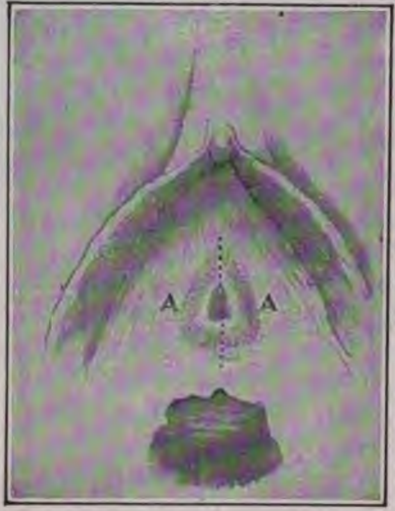

Fig. 472. Indicating the line of division of the urethra to give the view shown in Fig. 473. (Dudley—*Practice of Gynecology*)

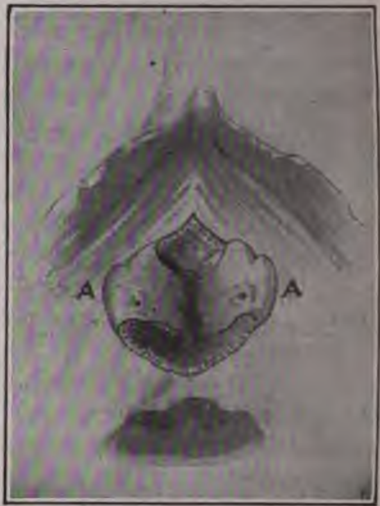

Fig. 473. The Urethra divided so as to show the openings of Skene's glands. The openings are situated just within the meatus, one on either side. (Dudley.)

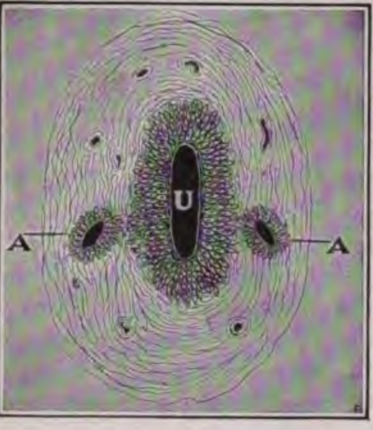

Fig. 474. Cross-section of the Urethra, showing the periurethral ducts (Skene's glands). U. Urethra. A. Periurethral Ducts. (Dudley—*Practice of Gynecology*.)

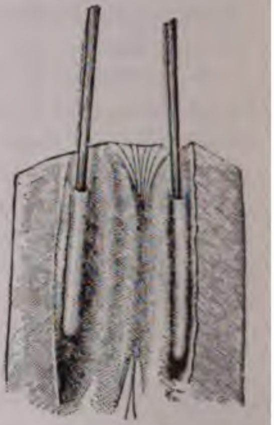

Fig. 475. This gives a clear idea of the size and relation of the periurethral ducts (Skene's glands). The floor of the urethra has been divided longitudinally, the end of the urethra raised and a probe introduced into each of the periurethral ducts. (Skene—*Diseases of Women*.)

The MEATUS URINARIUS, as well as the urethra, is lined with stratified squamous epithelium on a basis of connective tissue rich in cells. This connective tissue of the meatus and the urethra presents usually many typical lymph nodules of microscopic size. Just within the meatus, near the posterior wall, are the openings of two divertula, one on either side. They are known as Skene's ducts or Skene's glands. They are called also "periurethral ducts." Their size and shape and location are shown in Figs. 472, 473, 474, 475. They are important in that gonorrhoeal infection may extend into them and persist there indefinitely. Just back of the lining of the vestibule there are two masses of veins, one on either side of the vaginal orifice, called the bulbs of the vestibule (Fig. 476). The bulbi vestibuli lie just in front of the anterior layer of the triangular ligament. They are supposed to correspond to the corpus spongiosum of the male. In wounds of this region, or in operations, if these vascular bulbs are injured there is troublesome bleeding.

The **vulvo-vaginal glands** are two glands situated beside the vaginal entrance, one on either side (Fig. 49). They correspond to Cowper's glands in the male, though their relations to the triangular ligament is not so clearly defined, apparently varying some in different cases. They lie, as a rule, behind the anterior layer of the ligament, and may lie behind or in front of the posterior layer. Each gland lies very close to the lower end of the venous bulb of that side. The gland is a small reddish body about the size of a bean, and belongs to the racemose variety of glands. Its secretion is discharged through a small duct which opens just in front of the hymen, about the junction of the lower with the middle third of the side of the vaginal orifice. When the gland is normal, this opening has to be looked for rather carefully to be seen. When the gland has once become inflamed, the opening is easily seen, for it is larger and is usually surrounded by a small reddened area. The mucous secretion of the gland acts as a simple lubricant to the parts and is discharged during sexual excitement. When inflamed, the gland is felt as a hard tender mass beside the vaginal opening Fig. (51).

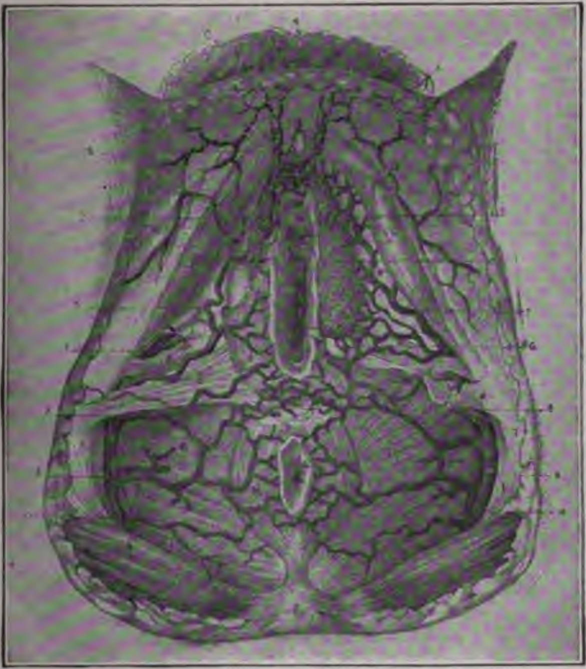

Fig. 476. The Veins of the External Genitals, including the "bulb of the vestibule," on the left side. V. Vagina. M. Meatus. 1. Left venous "bulb." (Savage—*Anatomy of Pelvic Organs.*)

The **hymen** (Figs. 208, 209) is a circular or crescentic fold of mucosa and submucous connective tissue, situated at the vaginal entrance and partially closing the same (Fig. 208). The shape of the hymen and the opening in it varies much in different persons. Fig. 209 shows several forms. The crescentic hymen and the circular hymen are the usual forms. The fimbriated hymen has a dentated or fringe-like margin. The cribriform hymen presents a number of small holes. In certain cases of malformation, the hymen is absent. In other cases it closed entirely (imperforate hymen).

The hymen is usually ruptured at the first sexual intercourse. In some cases "rupture of the hymen" amounts to nothing more than stretching, with slight abrasion. In other cases there is distinct tearing, with considerable pain and some bleeding. In rare cases there may be persistent and even serious bleeding. In some cases the hymen is so rigid or tender as to prevent coitus. Long continued sexual intercourse stretches the hymen until it is not at all prominent. Much medico-legal importance has been attached to the condition of the hymen, and, ordinarily, it is a decided help in determining whether or not coitus has taken place. But it is a well-established fact that an intact hymen is not absolute proof of virginity, nor is an apparently ruptured or stretched hymen absolute proof of sexual intercourse.

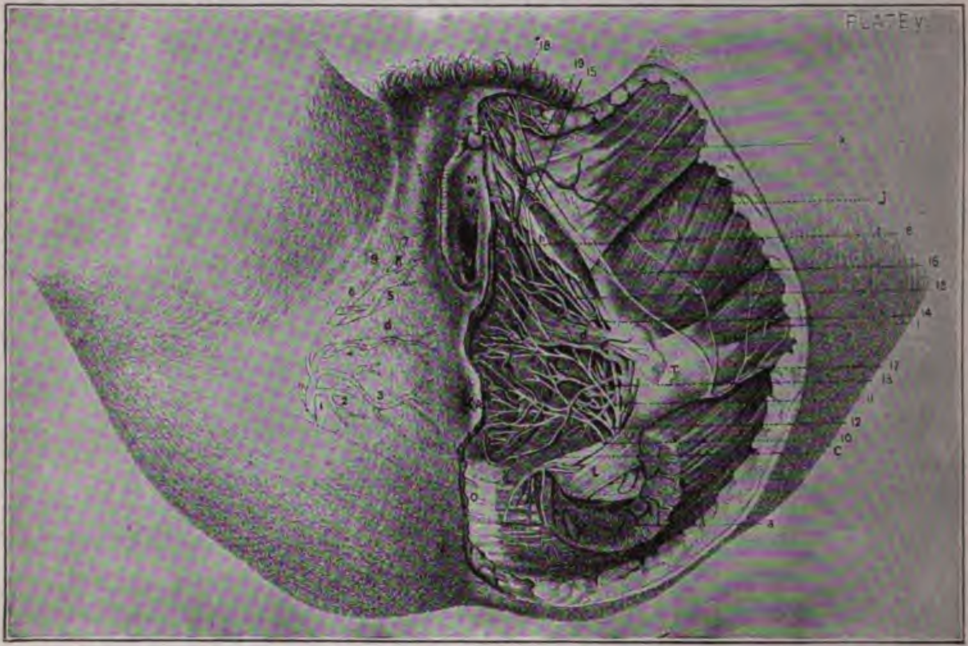

Fig. 477. The Arteries and Nerves of the external genitals. (Savage – *Anatomy of Pelvic Organs.*)

Childbirth destroys the hymen as an intact ring. Usually after parturition there are only irregular tags of tissue left, the result of tearing and sloughing about the vaginal entrance. These irregular tags of tissue surrounding the vaginal orifice are known as "carunculae myrtiformes," and result from child-birth only, not from sexual intercourse. Coitus does not usually destroy the hymen, but simply tears it slightly and stretches it.

The BLOOD SUPPLY of the external genitals (Fig. 477) comes principally from the internal pudic artery, one of the terminal branches of the anterior trunk of the internal iliac.

The LYMPHATICS EMPTY into the inguinal glands. Poirier calls attention to the fact that the lymphatics from the clitoris extend into the deep pelvic glands. Consequently in carcinoma of the clitoris proper (not its prepuce), the glands within the pelvis are soon involved.

The NERVE SUPPLY (Fig. 477) comes principally from branches of the pudic and small sciatic nerves. In certain painful affections of the external genitals, the pudic nerve is sometimes divided or resected to afford relief.

VAGINA.

The vagina is a musculo-membraneous canal extending from the vulva to the neck of the uterus, around which it is attached. It lies between the bladder and the rectum (Figs. 1 and 3).

Its size and shape are very variable and it is capable of great distension, as is seen when the child passes through it in labor. The length of the vagina is ordinarily three to four inches along its anterior wall, and five to six inches along its posterior wall. It is constricted at its lower end, where it is partially closed by the hymen, and becomes dilated towards the uterine extremity.

Normally the anterior and posterior vaginal walls lie in contact, and on cross-section the cavity is represented by a slit having somewhat the shape of the letter H (Fig. 478). The wide diameter of the vagina, some distance up the canal, is the transverse diameter, but the wide diameter of the vulvar cleft is the antero-posterior diameter. Furthermore, the anterior end of the vagina lies so far up in the narrow part of the pubic arch (in patients where the perineum has not been damaged) that there is not much room laterally. Consequently in introducing the speculum, the preferable way is to introduce one finger into the vaginal opening and press the perineum well back (Fig. 92), so that the vaginal opening is stretched antero-posteriorly and made to correspond in a measure with the vulvar cleft, and then introduce the speculum obliquely as shown in Figs. 92 and 93. When the speculum is well past the entrance, so that it may be used to depress the perineum, it is then turned with its width in the transverse diameter of the vaginal canal (Fig. 94) and introduced all the way. From my

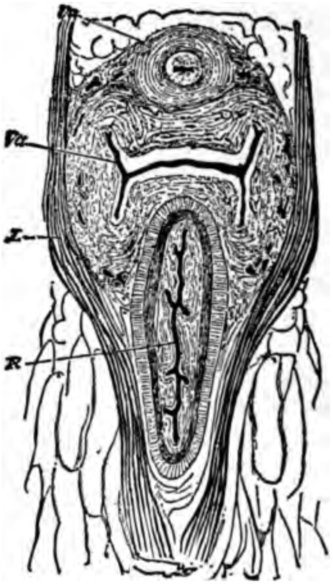

Fig. 478. Cross-section of the Pelvic Structures, showing the relations of the Urethra, Vagina, Rectum and Levator Ani Muscles. Notice how the vaginal walls fold so that the shape of the cavity approximates the letter H. Ur. Urethra. Va. Vagina. R. Rectum. L. Levator ani muscle. (Savage—*Anatomy of Pelvic Organs.*)

experience, I think this is decidedly the preferable way of introducing the speculum, when the perineum is intact and resisting. I consider erroneous the statement by some authorities that the speculum should be introduced with the wide diameter transversely, "because the wide diameter of the vaginal canal is transverse." The speculum must first pass the vulvar cleft and vaginal entrance, and we must deal with the conditions found there before accommodating the speculum to the wide diameter of the canal proper. Of course, in a large proportion of cases the perineum is lax from damage and the primary anatomical relations are destroyed, and the speculum may be introduced in any way without resistence.

Relations. Fig. 1 shows the angle which the axis of the uterus normally bears to the axis of the vagina. The upper end of the vagina surrounds the lower end of the uterus. That portion of the cervix uteri projecting into the vagina is known as the vaginal portion (portio vaginalis). The attachment of the vagina extends higher on the posterior wall of the cervix than on the anterior. The vaginal mucosa is continued on the cervix as far as the external os.

The upper end of the vagina is termed the "vaginal vault." The term "fornix" is also much used, the anterior fornix being that portion of the vault in front of the cervix, and the posterior fornix being that portion lying behind the cervix, and the right and left lateral fornix lying to the right and left respectively. With the for uterus in normal position, the posterior fornix is much deeper than the anterior, for the vaginal wall is attached higher on the posterior surface of the cervix than on the anterior.

The vagina is surrounded by important structures. The anterior wall is in contact with the urethra and the base of the bladder (Fig. 1). The vaginal wall and bladder wall and the tissue lying between them, constitute the vesico-vaginal septum. The posterior wall for the lower three-fourths of its extent is attached to the anterior wall of the rectum, except the very lowest portion, which is separated from the rectal wall by the perineum. The vaginal and rectal walls and the tissue lying between them, constitute the recto-vaginal septum. The upper fourth of the posterior wall is separated from the rectum by the recto-uterine pouch of peritoneum, known as the "cul-de-sac of Douglas" (Figs. 3 and 4). The sides of the vagina give attachment to fibers from the levator ani muscles and the recto-vesical fascia.

Structure. The wall of the vagina presents three layers—an external connective tissue layer, a middle muscular layer and an inner mucous layer. The CONNECTIVE TISSUE layer serves to attach the vagina to the adjacent organs. It contains the external plexus of veins, and is composed of connective tissue filled with lymphatics and blood vessels, the veins being especially numerous. The attachment of the vagina anteriorly is firm in the lower third, where it is attached to the urethra. It is more loosely attached to the bladder in the middle and upper third, particularly the latter, and is easily separated in operating.

The MUSCULAR LAYER contains involuntary muscle fibers arranged in bundles without distinct strata. Some of the bundles are longitudinal, some transverse and some oblique. The muscular layer is thicker at the lower than at the upper end.

The **MUCOUS LAYER**, or the lining of the vagina, is apparently a modified epidermis. It presents on the surface the usual layer of squamous epithelium several cells thick and, beneath this, connective tissue rich in cells. The glands have all disappeared and the papillae are much smaller than are encountered in the external genitals. The vagina normally contains no glands. The secretion found in the vagina comes from the cervix and the endometrium, principally the former. The vaginal walls are kept constantly moist with the secretion, and consequently the epithelium desquamates before it advances so far in the process of cornification as is seen in integument. In cases of prolapse, where the vagina is turned outside the vulva and is subjected to friction of the clothing and is kept dry by contact with the same, it becomes more like ordinary epidermis and shows well-marked keratin changes. The mucosa (epithelium and connective tissue immediately under it) is attached to the muscular coat by a submucous layer of loose connective tissue which is very rich in interlacing veins, about some of which are bundles of muscular fibres, forming a kind of cavernous tissue.

The vaginal mucosa is thrown into numerous large folds called "rugae." Extending longitudinally along both the anterior and the posterior wall of the vagina is a prominent ridge, best marked in the virgin. These ridges are known as the "columns" of the vagina, and from them the rugae extend laterally. The columns and rugae become more or less obliterated by child-birth, so that in many multipara the vaginal walls are almost smooth.

Vessels and Nerves. The blood supply of the vagina comes from the anterior trunk of the internal iliac, through the vaginal, uterine, middle hemorrhoidal and internal pudic arteries. These anastamose freely in the vaginal wall. The veins of the vagina are arranged principally in two plexuses that form complete vascular sheaths around the canal. One plexus is external to the muscular layer, while the other lies just beneath the mucosa. These veins form an intricate network and communicate freely with the plexuses of the other organs and with the plexuses of the broad ligament.

The lymphatics from the lower third of the vagina, it is generally held, join those from the external genitals and empty into the inguinal glands. But Poirier, who has made a special study of the subject, claims that all the lymphatics of the vagina empty into the pelvic glands and that when an injection of the vaginal lymphatics is made, even just within the hymen, no injection material passes to the inguinal glands except through some anastomosing channels. The lymphatics from the middle third of the vagina empty into the hypogastric glands. Those from the upper third join with the lymphatics of the cervix uteri and pass to the iliac glands.

The **NERVE SUPPLY** of the vagina comes from pelvic plexus of each side.

CLASSIFICATION OF DISEASES

Of The External Genitals and Vagina.

GONORRHOEA.

OTHER INFLAMMATORY DISEASES OF THE VULVA—**Simple Vulvitis, Follicular Vulvitis, Erysipelas, Cellulitis, Gangrene, Diphtheria, Eczema, Intertrigo, Herpes, Prurigo, Parasitic Diseases.**

OTHER INFLAMMATORY DISEASES OF THE VAGINA—**Simple Vaginitis, Parasitic Vaginitis, Diphtheritic Vaginitis, Emphysematous Vaginitis, Adhesive Vaginitis.**

ULCERS OF VULVA AND VAGINA—**Simple Ulcer, Chancroid, Syphilis, Tuberculosis, Malignant Disease, Ulcus Rodens Vulvae.**

URETHRAL AFFECTIONS—**Urethritis, Peri-urethral Abscess, Prolapse of Urethral Mucosa, Urethral Caruncle.**

VULVO-VAGINAL GLAND AFFECTIONS—**Inflammation, Abscess, Sinus, Cyst.**

NON-MALIGNANT GROWTHS AND SWELLINGS—**Condylomata, Cysts, Fibromata, Lipomata, Stasis Hypertrophy, Elephantiasis, Pudendal Hernia, Pudendal Hydrocele, Hematoma, Varicose Veins.**

INJURIES OF VULVA AND VAGINA.

MISCELLANEOUS AFFECTIONS—**Kraurosis Vulvae, Pruritis Vulvae, Hyperesthesia of Vaginal Entrance, Adhesions of Prepuce and Labia.**

(The more pronounced Malformations are considered in chapter XIII.)

GONORRHOEA.

Gonorrhoea is inflammation of the genital organs produced by the gonococcus. The term, when not qualified, is understood to mean gonorrhoeal inflammation of the vulva, vagina and urethra, i. e., gonorrhoeal vulvitis, vaginitis and urethritis. If the process extends into the uterus or Fallopian tubes or bladder, it causes complications known respectively as gonorrhoeal endometritis, gonorrhoeal salpingitis and gonorrhoeal cystitis. Gonorrhoea is sometimes referred to as "specific" vaginitis or vulvitis or urethritis.

ETIOLOGY.

Gonorrhoea is caused by contact of the affected organs with a gonorrhoeal discharge, usually in sexual intercourse. The infecting germ (the gonococcus) is a diplococcus, easily stained, and is found in large numbers in the pus cells of all acute gonorrhoeal discharges (Fig. 479). In chronic gonorrhoeal discharges it is not found so abundantly, in fact, in some cases it is so scarce as to be very hard to find, and may even disappear entirely for a time.

All discharges containing the gonococcus are capable of causing gonorrhoea. The slight urethral discharge from a chronic deep urethritis or from a stricture, persisting months or years after an attack of gonorrhoea in the male, is very liable to cause gonorrhoea when brought in contact with virgin soil.

A sad exemplification of this fact is seen in the many instances in which a bride is infected by her husband, who had gonorrhoea years before but supposed himself well. The consequence of such infection is that, instead of a healthy, happy woman with sons and daughters, the wife becomes a confirmed invalid in a childless home. This danger is not sufficiently appreciated by men generally—in fact, the man usually does not know the danger until too late. The responsibility of physicians in this matter is great, for the physician must decide when a man who has had gonorrhoea may safely marry.

The report of the special committee appointed by the American Medical Association to consider this question, is worthy of study (Journal A. M. A., March 30, 1901). The committee was appointed to determine whether a man who has had gonorrhoea may ever safely marry, and, if so, when? Careful inquiries were made and replies were received from the leading teachers of genito-urinary surgery in this country and in Europe.

Among the questions asked were the following, concerning of course gonorrhoea in the male:

1. Is gonorrhoea curable—so curable that the physician can confidently say to his patient, "You may marry now. You run no risk of infecting your wife"?

2. Upon what tests do you rely in order to determine positively whether the patient is wholly free from the gonococcus and is not infectious?

3. What period of time should elapse after the disappearance of the last evidence of the gonococcus before the patient should be permitted to marry?

The following, I think, fairly represents the concensus of opinion of the authorities quoted in that report:

1. CURABILITY. Gonorrhoea is curable with the following exceptions:

a. Gonorrhoea is not curable in the sense that the physician can guarantee that no infection will result therefrom, but so that in good conscience he can give an assurance that, in all human probability, no infection will result.

b. There are a few cases (estimated by one authority as about 3%) which, on account of an especially deep-seated lesion or serious complications, are incurable. These patients can never safely marry.

2. DETERMINATION OF CURE. All agree that the examinations must be thorough and repeated, and that only on the basis of repeated negative examinations, conducted over a considerable period of time, should the conclusion be reached that the patient is no longer infectious.

The following points are insisted on:

a. Absence of the gonococcus.
b. Absence of pus germs.
c. Absence of pus cells.

It is pointed out that the ordinary pus germs may cause trouble, and that cases have occurred in which the husband carried to the wife a pyogenic infection causing serious pelvic disease, though the gonococcus had entirely disappeared and did not reappear in either husband or wife.

3. TIME LIMIT. The period of time which should elapse after the disappearance of the last evidence of the gonococcus before the patient should be permitted to marry, is given by several authorities as one year. Others state three months to a year, depending on the circumstances of the case.

Though the usual cause of gonorrhoea is sexual contact with an infected person, it may exceptionally be caused by other means, as by contact with an infected towel or douche-nozzle or chamber utensil or closet-seat.

PATHOLOGY.

There is acute inflammation of the vulva and usually of the vagina and of the urethral mucous membrane near the meatus.

There are present the cardinal signs of inflammation—heat, pain, redness and swelling. There is at first abnormal dryness of the parts, then a slight secretion, which rapidly increases in a day or two, and when the inflammation is well established it becomes a free yellow discharge, causing much irritation of the adjacent surfaces. There is the ordinary serous and cellular infiltration into the involved areas. The most superficial layers of epithelium are thrown off and the gonococci penetrate the underlying tissues to a greater or less extent, depending on the severity and duration of the inflammation. There may be, later, a mixed infection, one or more of the ordinary pus germs being found with the gonococcus.

The process may affect only the vulva or the upper part of the vagina. Some authorities state that this is the rule, but in my experience such limitation is exceptional in adults with primary infection, the first examination usually showing involvement of practically all of the vaginal wall.

The gonorrhoeal inflammation is very liable to extend into one or both of the vulvo-vaginal glands or into the cervix uteri, and to remain active there after all other symptoms have disappeared.

In the gonorrhoea of children the process is usually limited to the vulva and urethra, for the reason that penetration of the vagina by the infection carrier rarely takes place.

In reinfection in adults, the process is comparatively mild and is usually limited to certain areas, for example the vulva or urethra or upper part of the vagina.

The gonococcus seems to thrive best in the urethral mucous membrane, and it may penetrate into Skene's glands and remain there indefinitely.

SYMPTOMS.

Within a few days after suspicious coitus the patient complains of slight irritation about the genitals. The parts feel dry and uncomfortable, and there may be a slight burning sensation. The feeling of discomfort increases and a discharge appears. About the same time or a little later, there is noticed a smarting or burning on urination and increased frequency of urination. Within two or three days of the beginning of the trouble the discharge is profuse and the signs of irritation (burning and itching and frequent painful urination) are marked.

On inspection, the structures immediately surrounding the vaginal orifice are found reddened and painful on pressure. There is a yellow discharge from the vagina and frequently some discharge from the urethra. Acute gonorrhoeal discharge leaves a yellow stain where it dries on the clothing.

On digital examination, the vaginal walls are found rough and hot and tender. Pressure on the anterior vaginal wall directed from the upper end of the urethra to the meatus, will bring to view one or more drops of urethral pus (Figs. 46, 47). If the case has passed beyond the acute stage, the pain and discomfort are not so marked, but the discharge, more or less profuse, is still present,

DIAGNOSIS.

Gonorrhoea must be distinguished from vulvitis and vaginitis due to various other causes.

The distinguishing characteristics of gonorrhoea are as follows:

1. **Rapidity of development and severity of symptoms.** The inflammation with its accompanying symptoms usually reaches its height within the first week and then begins to subside. As a rule with but few exceptions, other inflammations of the vagina are not so severe nor the discharge so profuse. Occasionally there occur instances of very mild gonorrhoeal infection. This mild reaction to the the gonococcus is found almost exclusively in tissues that have suffered previous gonorrhoeal infection or that have become somewhat hardened by frequent childbearing.

2. **Involvment of the urethra and vulvo-vaginal glands or ducts.** These extensions of the inflammatory process are rare in ordinary pus infections. In fact the involvement of the meatus and of the openings of the ducts of the vulvo-vaginal glands is so constant in gonorrhoea and so infrequent in other forms of inflammation, that some authors hold that it can be determined whether or not a patient has ever had gonorrhoea by determining the presence or absence of evidences of previous inflammation of the structures just mentioned. Such evidences are a reddish margin around the meatus, with rolling outward and chronic congestion of the urethral mucous membrane, and a bright red spot marking the orifice of the vulvo-vaginal gland of each side (so called ''gonorrhoeal maculae"), and sometimes pressure on the gland will cause pus to appear at the opening of the duct (Fig. 50) Though such inflammation is usually caused by gonorrhoea, it occasionally occur from other causes, and consequently is not an absolute indication of previous gonorrhoea.

3. **No other apparent cause for the inflammation.** Vaginitis other than gonorrhoeal presents some cause for its existence, for example, pus infection following labor or abortion, the use of an infected douche-nozzle or the development of that local nutritive change which causes senile vaginitis.

4. **Development within a few days after sexual intercourse.** Considerable pain from slight traumatism and some bladder disturbance may follow coitus, particularly in the newly married, but such cases do not present the profuse yellow dis-

charge of gonorrhoea. In the case of a married woman, be careful not to question her in such a way as to associate the trouble with coitus, as it may arouse her suspicion and cause trouble in the family.

5. Presence of the gonococcus. The presence of the gonococcus is determined by microscopic examination of the pus from the infected areas. With the tip of the applicator take a small amount of the urethral discharge and spread it in a thin film on two glass slides, or on cover-glasses if preferred. If using cover-glasses, spread four or five with the urethral pus, for some may get broken. If desired, specimens of pus may be taken from other localities also, for example, from the ducts of the vulvo-vaginal glands or from the upper or lower part of the vagina or from the cervix, the specimens from the different localities being designated as described on page 35.

Staining the Gonococcus.

One of the spread preparations, on a cover-glass or a glass slide, is stained by a methylene-blue solution. If the microscopic findings, taken in connection with the history of the case and the physical signs, make the diagnosis clear, no further staining is necessary. If it is doubtful, then another prepared cover-glass or slide is subjected to Gram's decolorization method.

The details of staining are practically the same whether the preparation be on a glass slide or on a cover-glass. The cover-glass is held in a forceps, while the slide is held in the fingers.

We will suppose the preparations are on cover-glasses and were made some minutes ago and laid aside, while the other steps in the diagnosis and treatment were carried out and the patient dismissed.

The cover-glasses are now dry and ready to be stained.

1. Staining with methylene-blue solution. The steps in this process are as follows:

a. With the cover-glass forceps pick up one of the prepared cover-glasses, charged side up, and pass it, rather slowly, three or four times through the flame of the Bunsen burner or alcohol lamp. This "fixes" the specimen to the glass, so it is not washed off in the subsequent manipulations.

b. Flood the prepared surface of the cover-glass, held in the forceps, with a few drops of Loffler's alkaline methylene-blue solution or 1% aqueous solution (fresh) of methylene-blue. Hold the cover-glass high above the flame, so that it steams some but does not boil, for about half a minute. This stains the specimen.

c. Then wash off the excess of stain with clear water.

d. Then lay the cover-glass, charged surface down, on a clean glass slide and remove the excess of water and dry the upper surface of the cover-glass with blotting paper.

e. Put on a drop of cedar oil and examine with the oil-immersion lens. The microscope for this work should be provided with a 1-12 inch oil-immersion lens and an Abbe condenser. The cover-glasses should be very thin (No. 1). The No. 2 cover-glasses do not break so easily, but every once in a while there is one that is too thick for the use of the oil-immersion lens. The cover-glasses may be kept in alcohol in a flat wide-mouthed bottle, from which they are removed and dried (cleaned) as needed.

In the methylene-blue **specimen,** the nucleus of each pus cell is stained a light blue. These nuclei are very irregular in shape and some of them are broken into two or more parts. They form the prominent light blue masses which largely occupy the field. The protoplasm, or body, or each cell is stained only very faintly, so faintly that it is ill-defined and hardly noticeable. All bacteria taking the stain, including the **gonococci,** are stained a very dark blue (almost black) and contrast well with the light blue nuclear masses.

In vaginal specimens, the field is so filled with bacteria of various shapes and sizes, that the gonococci are more or less obscured. In urethral specimens, however, there are as a rule but few other bacteria and consequently the gonococci are more easily found.

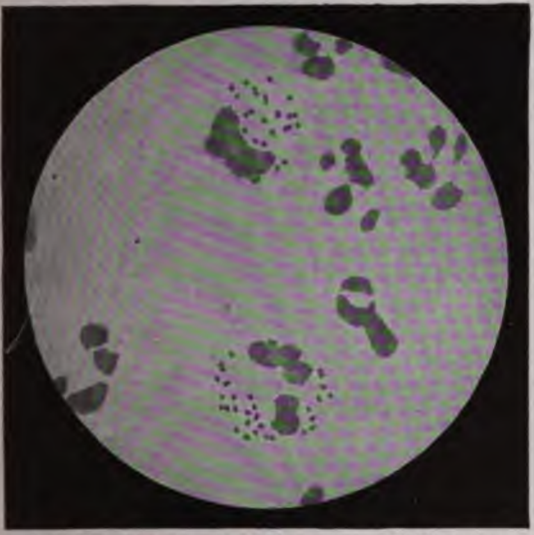

Fig. 479. Specimen of pus from a case of Gonorrhoea, stained with Methylene-blue. This field contains two gonococcus-colonies, each within a pus cell. Only the nuclei of the pus cells are seen. The lower colony has the circular outline of the cell containing it. (Kolle and Wassermann—*Handbuch der Pathogenen Mikroorganismen*).

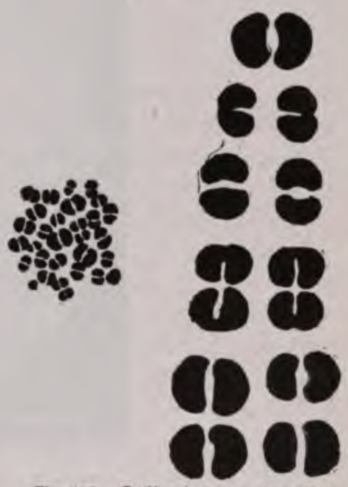

Fig. 480. Indicating the Shape of the diplococcus of gonorrhoea (Gonococcus). (Byford—*Manual of Gynecology.*)

In acute gonorrhoea the gonococci are seen lying in colonies in the pus cells (Fig. 479) with a few scattered between the cells. They occur as diplococci, the two together having about the shape of two coffee grains with their flat surfaces turned toward each other and slightly separated (Fig. 480). They are spoken of as "biscuit-shaped" or "roll-shaped."

The occurrence of the gonococci in small detached groups (Fig. 479), is a striking feature in a good specimen. The little colonies occur inside the pus cells, the pus cell
ecognized by the well-marked blue nucleus of irregular shape. The proto-
ardly visible, but it is known that the gonococci must be within the cell be-
are grouped so closely about the nucleus. In some cases the cell has
and the colony has outgrown its dimensions. But the colony is still

close to the disintegrating nucleus, and the outlines of the colony have the general circular shape of the cell which recently housed it. At some other point a cell has advanced still further in the process of disintegration and has largely disappeared and the colony of gonococci has broken up, the individual gonococci being scattered through the space between the other cells. Only comparatively few of the pus cells show a gonococcus colony. In some cases several microscopic fields, filled with pus cells, may be looked over without seeing a gonococcus, and then a pus cell with a fine colony is encountered.

The **distinguishing characteristics** of the gonococci are:

a. Roll-shaped diplococci, occurring in detached groups or colonies.
b. Presence within the pus cells.
c. Decolorization by Gram's method of staining.

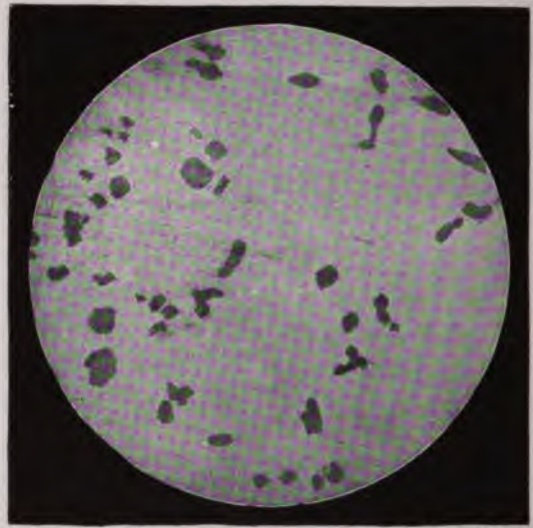

Fig. 481. Specimen of pus from a case of Gonorrhoea, stained by Gram's Decolorization method. As explained on the next page, the gonococcus is a "Gram-negative" bacterium, and hence is decolorized by this method and does not appear in a specimen thus prepared. (*Photomicrograph by Dr. C. Fisch.*)

In acute cases it is rarely necessary to stain by Gram's method. If the patient gives the clinical history and evidences of acute or subacute gonorrhoea, and the microscopic examination of the discharge shows a diplococcus within the pus cells, presenting the form of the gonococcus and occurring in large numbers and arranged in groups and without other bacteria to account for the discharge, that patient has gonorrhoea beyond a reasonable doubt.

If the patient presents the clinical evidences of acute gonorrhoea and microscopic examination of the discharge shows the absence of a diplococcus, such as above described, the strong probability is that the trouble is not gonorrhoeal, though it is well to make more than one examination (different days) before deciding adversely to the ordinary clinical evidences.

In the acute inflammations that are not gonorrhoeal, there is usually found some

other germ, of sufficient virulence and in sufficient numbers, to account for the discharge. If there is any question as to the identity of the supposed gonococci, preparations should be subjected to Gram's stain.

2. Decolorization by Gram's method. The feature of Gram's staining method is that certain bacteria are stained by it (Gram-positive bacteria) while others are decolorized and hence do not appear in the specimen (Gram-negative bacteria). The gonococcus is "Gram-negative," hence it is not seen in a specimen so prepared. The value of this lies in the fact that certain other bacteria resembling the gonococcus closely as to form, are Gram-positive and hence appear deeply-stained in a Gram preparation.

Consequently in an acute case, if, after examining a specimen of pus stained with the methylene-blue solution, and finding bacteria of the form and distribution of the gonococcus (Fig. 479), another specimen of the same pus is stained by Gram's method and these bacteria do not appear (Fig. 481), the bacteria in question are certainly gonococci.

The regular Gram method is quite long and troublesome. Dr. E. F. Tiedemann, Professor of Pathology in Washington University, has devised a convenient modification of it. I quote the details from his published report.

"Gram's discovery of his differential stain was a great achievement; but it is not used by the general practitioner as much as it should be, for it is complicated and time-consuming. In order that a method may be generally used, it must employ simple and stable solutions and must be reliable and quick. I have therefore endeavored to simplify and shorten Gram's method, and my experiments have resulted in the method described below:

"1. Make a thin smear on a cover-glass.

2. Dry in the air.

3. Without fixation, flood the cover-glass, held by forceps, with a 2 per cent solution of crystal violet (Hochst, pure) in methyl alcohol. Allow the stain to act for 15 seconds; wash off the stain slowly with distilled water, by letting it fall on drop by drop from a pipette; this takes about 10 seconds; then wash both surfaces of the cover-glass briskly with distilled water.

4. Flood the cover-glass with the following solution:

Iodine,	1 gram.
Potassium iodide,	2 grams.
Distilled water,	100 cc.

Allow this to act for 15 seconds.

5. Pour off the iodine solution and pour on 95 per cent alcohol, at first quickly, then slowly until no more color is given off. This takes about 10 seconds.

6. Wash thoroughly with distilled water and mount in water, or—after drying—in balsam.

The Gram-positive bacteria appear bluish-black.

"The advantages are: Absence of fixation, the use of a simple methyl-alcohol solution of the dye which keeps indefinitely instead of the usual aniline-water gentian-violet solution, which is troublesome to prepare and keeps only for a few weeks, the use of ordinary 95 per cent alcohol in place of the absolute alcohol usually advised, and finally the shortening of the various steps; the entire process is completed within one minute after the violet stain is applied.

"Gentian violet or methyl violet may be used in the same manner and strength in the place of crystal violet, but the last named gives the best results.

'Methyl alcohol cannot be substituted for ethyl alcohol for decolorizing, because it dissolves out all the stain from the Gram-positive bacteria.

"It is possible to combine the violet stain with iodine in one solution and to stain with this mixture and then apply alcohol, which will remove the color only from the Gram-negative bacteria. But the results are not so good, and the method above given is already so simple that I do not advise the combination of the violet stain with iodine in one mixture.

"Experience has shown that the alcohol removes the stain completely from the Gram-negative bacteria in a few seconds, but will take it from the Gram-positive bacteria only after the lapse of some minutes."

Significance of the Microscopic Findings.

In a few cases, diplococci showing the staining qualities of gonococci have been found in patients where apparently there has never been gonorrhoea. But such cases are exceptional and only serve to show that the positive diagnosis of gonorrhoea must rest on the clinical symptoms and microscopic findings together, and not on the microscopic findings alone.

As already stated, in **acute** and subacute cases there is rarely any difficulty in determining certainly whether the trouble is or is not gonorrhoeal.

In **chronic** cases, on the other hand, there is often great difficulty. If a few apparent gonococci (shape, groupings, situated in pus cells, decolorized by Gram's method) are found, the diagnosis is not positive (may be "pseudo-gonococci"), though the strong probability is that the lesion is gonorrhoeal, if the history and ordinary examination findings point that way. The employment of culture methods by a skilled pathologist may aid some in deciding the question in a doubtful case.

If no apparent gonococci are found in a chronic discharge, that is not proof that the lesion is not gonorrhoeal. In many cases of chronic discharge from lesions that are undoubtedly gonorrhoeal, no gonococci are found, because they have temporarily disappeared from the secretion. But they lie hidden in the tissues from which the discharge comes and are still capable of causing infection, and they are likely to be excited to activity by anything that causes pelvic congestion, as, for example, sexual intercourse or an attack of pelvic inflammation.

Thus it is seen that the presence or absence of apparent gonococci falls short of decisive import in a considerable proportion of cases of chronic discharge.

Diagnosis in Doubtful Chronic Cases.

In the doubtful chronic cases, just referred to, an approximately correct diagnosis may be made by giving attention to the following points:

1. Careful consideration of the clinical history as pointing to previous gonorrhoea or excluding the same. In this connection, it must be borne in mind that in the adult married woman, particularly after the vagina has been toughened by child-bearing, gonorrhoea may produce but slight inflammation of the vagina, and hence might be missed entirely in the history. A point against gonorrhoea is that the inflammatory trouble was apparently caused by infection following labor or abortion or by instrumentation or by some other sufficient cause aside from coitus. Remember, however, that an old gonorrhoea may be stirred up by labor or abortion. From a chronically inflamed vulvo-vaginal gland or cervix uteri the infection may spread upward into the body of the uterus and there set up a puerperal gonorrhoeal endometritis. This may be the first decided intimation the patient has of her gonorrhoeal infection. The discharge from such a fresh focus usually shows undoubted gonococci in abundance, if the patient happens to be seen at that time.

2. Evidence of inflammation of the urethra or of the duct of one or both vulvo-vaginal glands.

3. The presence in the discharge of a germ presenting the characteristics of the gonococcus. In a patient who has once had gonorrhoea, the presence in the discharge of such a germ is strong presumptive evidence that the gonorrhoeal process is still active.

4. Effect of treatment. A chronic inflammatory trouble due to the gonococcus is usually more resistent to treatment than when due to other causes.

5. Tubal complications. Chronic salpingitis, is much more frequent and persistent in gonorrhoeal than in other forms of endometritis. Also, it is more frequently bilateral.

6. Sterility. Persistent sterility is one of the marked characteristics of gonorrhoeal inflammation, much more so than of the ordinary pyogenic infection.

7. History of gonorrhoea in the husband. This fact, if established, would of course help much in the diagnosis in a doubtful case. In such a case the husband should be seen and questioned. As a rule no question on this point should be asked the wife, as it might arouse suspicion in her mind, and cause domestic trouble that would bring more unhappiness than the pelvic disease.

TREATMENT.

The treatment of acute gonorrhoea in women, like the treatment of the same disease in men, has been the subject of much experimentation and of many different conclusions. The treatment employed by different authorities varies all the way from the most active and radical interference to practically no treatment beyond some external cleansing.

Before stating in detail the methods, I would like you to get clearly in mind the principal purposes of the treatment. They are as follows:

a. **To prevent extension upward** of the disease to the endometrium and Fallopian tubes. The extension to the Fallopian tubes is the most serious result of gonorrhoeal infection and condemns a large proportion of the victims to chronic invalidism or to a serious operation. In either case, there will probably be sterility.

b. **To completely eradicate the infection** from the lower genital tract so that no infective discharge will remain. As long as one spot of gonorrhoeal inflammation remains in the vagina or in the vulvo-vaginal glands or in the urethra or in the uterus, the discharge is infective and is a source of danger to the patient and to those around her. At any time, there may be an extension upward to the tubes or there may be infection of the eyes of the patient or of some one else in the household. It is probable that a considerable number of the cases of gonorrhoeal vulvitis in children come from accidental infection from a contaminated towel or closet-seat, in the home or elsewhere.

c. **To relieve the discomfort** attendant on the inflammation and to prevent contamination of the patient's clothing and surrounding objects with the discharge.

It must be recognized at the start that the principal influences preventing extension upward of gonorrhoea, are the resistance of the tissues and the barriers (constrictions, cervical mucus) placed in the canal by nature for the purpose of protecting the deeper organs.

The strength of this natural resistance to the spread of the disease varies much in different persons. In some cases the gonorrhoea is well limited, extending upward not at all or only by short steps at long intervals. In other cases it runs a rapid course from the external genitals to the inmost recesses of the genital canal.

This marked variability in the course of the disease is easily demonstrated by closely questioning patients who give a history of gonorrhoea some months or years before.

The favorite time for extension to the endometrium and Fallopian tubes, is during the last day or two of menstruation and the first few days following menstruation.

No measure of treatment should be employed that interferes with the natural protective influences.

One point of particular importance, is to be very careful not to carry the infection any further than it has already extended. For example, the examination and treatment should be confined to the inflamed vulvar surfaces alone, unless there is positive evidence (such as a profuse discharge) that the trouble has extended past the vaginal entrance. Likewise in vaginal gonorrhoea, no treatment or examination should extend past the external os of the cervix uteri, unless there is unmistakable evidence that the gonorrhoea has extended into the cervical canal.

A second important point is to use no application or instrumentation that will injuriously irritate the surfaces. Though such a strong irritating antiseptic application may kill most of the gonococci on the surface, it causes so much desquamation and irritation of the surface that it favors multiplication and penetration by the remaining gonococci and tends to cause, rather than prevent, extension of the process, both into the tissues and upward along the surface.

On the other hand, when no treatment is employed, the accumulating irritating discharge and vast colonies of bacteria in the affected canal, caused marked irritation, and favor extension deeper into the tissues and upward along the canal.

I think the best results are achieved in most acute and subacute cases by a program about as follows:

1. **Office applications.** If inspection shows that the process is apparently confined to the vulva (including meatus urinarious and ducts of the vulvo-vaginal glands) be very careful not to carry the examining finger or the applicator or

other instrument past the hymen or hymen-remnants. Having secured the required specimen for microscopic examination, the parts are cleansed and the affected surfaces painted over with a 25% solution of argyrol or a 2% to 5% solution of protargol. The application is made with a small cotton-ball (the size of a bean) caught in the end of the dressing forceps and dipped into a small amount of the solution poured out into a medicine glass. Or a cotton-wrapped applicator may be used. Silver nitrate solution (1% to 5%) does very well, but is rather painful, and the discoloration it causes on the clothing and fingers is not removed by washing.

After a free application of the medicine has been made, the surfaces are dried and some drying antiseptic powder dusted in. I use xeroform and boric acid (1 to 3) and find it very satisfactory, and without the odor that attaches to iodoform. Most any non-irritating antiseptic powder will answer the purpose. If it is found that the patient experiences more smarting and burning after this drying of the surafce, the powder may be left off the next time.

A large piece of absorbent cotton is applied to cover the vulva, the inner portion being so disposed as to lie between the inflamed surfaces, to keep them apart and absorb the discharge. The cotton is held in place by a T-bandage.

If the examination shows that the process has extended up into the vagina and the tenderness has subsided so that the speculum may be used without pain, the speculum is introduced and the affected areas (usually, in the primary acute attack, the entire vaginal wall and vaginal surface of cervix) are painted with the 25% argyrol or one of the other solutions above mentioned. The vagina is then dried and the non-irritating antiseptic powder dusted in.

The vulva is treated in the same way and covered with absorbent cotton, as above described.

2. Prescriptions. Give the patient a prescription for a concentrated antiseptic solution for making up an antiseptic wash or douche solution as required. I usually give the regular bichloride douche solution (see Formulæ).

The bichloride tablets are cheaper, but they are dangerous to have about a house where children live or may come visiting.

If the patient is nervous and sleepless and upset by the trouble, give a prescription for some sedative solution, such as the sodium bromid solution (see Formulæ), with instructions to take at 8 and 10 P. M. and 8 A. M., and repeat after three hours, when very restless.

If the patient is not very nervous, but complains of marked bladder irritability (frequent painful urination) give the hyoscyamus and potassium citrate mixture (see Formulæ) instead of the bromide.

If there is neither marked bladder irritability nor decided nervous disturbance requiring a prescription, it is well to give the patient some one of the internal urinary antiseptics, which tend to prevent extension of the trouble along the urethra and tend also to allay discomfort there, such as urotropin or cystogen. Tell her to get also a pound of surgical absorbent cotton.

3. Instructions. Give the patient the following instructions:

a. When you reach home, lie down and stay in bed practically all the time, as long as there are any acute symptoms (pain, burning, bladder irritability). It is especially important to be quiet in bed during menstruation and for some days afterward.

b. Keep the bowels well open every day, as that tends to diminish the pelvic congestion. Free bowel movements should be secured by internal laxatives. No enema is permissible, ordinarily, because of the danger of carrying the infection into the rectum. For the same reason, rectal suppositories should not be used.

c. Keep the parts covered with a large piece of absorbent cotton, held in place by a bandage or napkin such as is used during menstruation. As often as the inner surface of the cotton is soiled it should be removed and a fresh piece applied. This removes the discharge from the inflamed surfaces and prevents the irritation that would result from its accumulation there. More important still, it prevents general contamination of the clothing and hands and other surfaces by the infective discharge. Each time, after the patient changes the dressing, she should immediately cleanse her hands with soap and water and then in the antiseptic solution which she uses for a douche.

In explaining to the patient the necessity of keeping the infected surfaces covered with cotton, and of changing the cotton often and of washing the hands well afterward each time, take particular care to **arouse no suspicion** that might lead to domestic infelicity.

Your work is to lessen suffering, not to cause it. If the patient should become apprised of the fact that her husband has been untrue to her and in addition has brought to her a loathsome disease, her suffering would be far greater than any physical distress that might result from the disease, even though it goes on to pelvic suppuration requiring operation.

I have no sympathy for the man who commits adultery and brings a disease of the women of the streets to the pure woman whom he has promised to love, cherish and protect. He reaps his reward in due time. It is not to protect him that I mention the need of caution, but to protect the woman herself from unnecessary suffering. This can usually be accomplished by the exercise of a little tact. To the patient's question, "What is the trouble?" a good answer is "Inflammation." Then pass quickly to the directions concerning treatment. At a convenient time mention that the discharge is irritating and that she must be careful that none be carried to the eyes on contaminated fingers or serious inflammation of the eyes may result. The patient usually becomes so interested in the treatment that she forgets to inquire as to the cause of inflammation. However, if she asks, as they sometimes do even when having no suspicion, "Doctor, what is the cause of inflammation?" I usually reply that "Inflammation is due to various causes," in a tone that shows that I have neither the time nor the inclination to give the patient a course in medicine in order that she may understand all the details about inflammation. This rarely fails to stop troublesome questions. Of course, some patients are so suspicious that they will not stop questioning until they have gotten all the information they can possibly secure, while others are well aware of the nature of the trouble and question the physician out of curiosity or to see if he has a grasp of the situation. With such I do not waste much time. I will not tell them the exact nature of the trouble, when I do not think best to do so, neither will I tell them an untruth. When pressed too closely, I simply remind them that their principal desire is to get well, that they have come to me for treatment, that I am giving them the treatment, and have given them all the information necessary to treatment. If not satisfied with that they may go elsewhere.

Of course, some patients know or will probably find out in a short time the nature of the trouble. But I prefer that they find out from some other source, if at all. My imparting the information, or confirming that imparted by some of their anxious friends, will do no good and may do much harm.

d. Use the weak antiseptic wash every 3 to 6 hours, depending on the amount of discharge. If the vagina also is involved, have the patient, in addition to the external washing, take a douche of the weak bichloride solution about every eight hours. The internal remedies mentioned are to be used as indicated by the special symptoms in the case.

e. The patient should be directed to return for local treatment every second or third day, provided she can do so without aggravating the inflammation.

If there is much discomfort in walking or if the patient must come a long way to reach the office, she will experience more benefit from remaining quiet at home and following the directions already given for the treatment there.

4. When the patient can come to the office without detrimen , treat the affected surface just as described for the first visit. Such treatment, so applied as to cause no irritation, seems to me to aid materially in diminishing the patient's discomfort and in hastening the subsidence of the inflammation. The treatment is repeated every second or third day until all inflammation has disappeared from the affected surfaces, the intervals being gradually lengthened as improvement takes place.

I do not think it advisable during this first part of the attack, that is, in the first two or three weeks, to swab out the lower part of the urethra or of the cervical canal, or to inject medicine into Skene's glands or into the ducts of the vulvovaginal glands. Such treatment is likely to carry the inflammation further in than it might otherwise go, and may make permanent an infection which nature would throw off if given a little time. If inflammation in any of these situations persists into the chronic stage, then they require particular treatment.

In those very severe acute cases where the patient suffers a great deal from the burning, itching, smarting and throbbing pain, and the trouble is increased when the patient stands, she should be put to bed and kept there until the most acute symptoms have disappeared. In the meantime, she should follow the directions given for the treatment at home. If the weak bichloride solution seems to cause any irritation (it does with some patients), use a weak ¼% lysol solution or some other antiseptic in weak solution. The potassium permanganate douche (see Formulæ) is effective.

The principal effect of the wash and douche is to remove mechanically the irritating secretion. It may be used warm or tepid or cool, as found most agreeable.

In cases where the smarting and itching are marked, the 25% argyrol may be applied with the patient in bed, by bringing the patient around in the bed, with each foot on a chair, as for a vaginal examination (Fig. 116). If neither the cleansing nor the argyrol applications relieve the smarting about the external genitals, give the patient a prescription for the "lead and opium wash" (see

Formulæ) and direct her to use it freely, dabbing it on with cotton balls frequently enough to keep the surfaces moist with it.

In some of these severe cases, a hot sitz-bath every 4 to 6 hours gives considerable relief.

Treatment of Chronic Gonorrhoea.

A chronic gonorrhoeal discharge is due to persistence of the specific inflammation in one or more isolated areas. When such a discharge persists after the inflamed surfaces generally have returned to normal (i. e, after 3 to 6 weeks, depending on the severity of the inflammation), make careful search for its exact source. The situations in which the inflammation is likely to persist are the:

Vulvo-vaginal glands or ducts.
Skene's glands, in the urethra.
Upper end of vagina.
Cervix uteri.
Corpus uteri.

In Vulvo-vaginal Glands or Ducts. Persistence of the gonorrhoeal inflammation in the duct of a vulvo-vaginal gland, is indicated by reddening about the mouth of the duct and by a discharge from it, a drop of which may usually be pressed out. Microscopic examination of this discharge usually shows gonococci in abundance, though in some old cases they may disappear temporarily.

The **treatment** for this condition is to make an application of 25% argyrol or 5% to 10% protargol about every other day.

The acute and subacute symptoms have all disappeared, and the patient may now come to the office as often as necessary, without any probability of disturbance from the exercise.

The application of argyrol or protargol to the interior of the duct is made by a fine applicator with a thin cotton wrapping.

The mouth of the duct should be opened so it will easily admit the applicator carrying the medicine. Occasionally the necessary widening may be effected by simple dilatation. Usually, however, it will be necessary to incise the opening so as to give a wide entrance.

A small piece of cotton soaked in 20% cocaine solution is laid over the area, a small amount being pushed into the opening a short distance. Leave this in place 5 minutes. Then introduce into the duct the sharp point of a slender bistoury and make a cut outward or downward from an eighth to a quarter of an inch. If the external application of cocaine does not obtund the sensibility, as tested by the bistoury point before cutting, inject some ½% cocaine solution or some of the Schleich solution No. 2 (see Formulæ) into the area to be incised.

When the duct is thus made accessible, make a thorough application to its interior, taking care, however, not to carry the infection into the gland if it has not already gotten there.

The other duct if involved is treated the same way.

If the inflammation subsides the applications are kept up until all discharge ceases, lengthening the intervals as improvement takes place.

There are usually other points, as in Skene's glands, or in the cervix, that require treatment at the same time.

If no decided improvement appears after a few applications, the affected duct with its gland needs to be extirpated. Also, if the gland shows evidence of chronic involvement (firm nodule in that situation) it requires extirpation, for as long as it remains, it prevents complete cure and the discharge from it is a source of danger.

If an abscess forms in the gland, it is allowed to develop until the gland is probably destroyed and the collection is near the surface, covered only by a thin wall of tissue. It is then opened freely.

If the abscess is well developed so that all septa are destroyed and the recesses form part of the main cavity, there may be complete healing afterward and an end of the trouble. If a second abscess forms later, however, that means that portions of the infected gland remain, and in such a case, all the involved indurated tissue should be extirpated, after the abscess has been drained and all acute symptoms are gone. When it is necessary to wait a few days for an abscess to get in good condition for opening, the patient is directed to stay in bed and make hot applications of absorbent cotton wrung out of very hot water or weak antiseptic solution, and covered with oil silk. As a rule the pain is not severe until the abscess is ready to open or about ready to break.

Then the patient may come to the office, or, if movement is very painful, it may be opened at her home.

In Skene's Glands. When the gonorrhoeal inflammation invades these periurethral ducts it may remain there indefinitely, causing symptoms of chronic uretheritis or chronic cystitis and a persistent infective discharge. There is redness about the urethra and pouting outward of the swollen urethral mucosa. If the patient has passed through parturition, the opening of the duct on each side may usually be seen by rolling out the urethral mucosa (Fig. 48). If the duct is open a drop of pus may be pressed from it. If the duct is closed, a small abscess forms in it.

To treat these conditions, apply a pledget of cotton soaked in a 20% solution of cocaine, pushing a part of it a short distance into the urethra. Leave this in place five minutes and then proceed as follows:

If the duct is open, inject a 25% solution of argyrol into it with a hypodermic syringe. Use a needle the point of which has been filed round and smooth, so it will easily pass into the duct without penetrating the wall. Fill the duct with the solution so that it comes in contact with all the recesses. This is simply a small duct. There is no gland back of it, into which infection may be carried, so the medicine may be injected freely. This injection is repeated every few days, at the same time that other infected structures are treated.

If the inflammation persists in spite of this, then dilate the urethra and slit open the ducts and treat their interior directly with the solutions already mentioned. Some prefer to make very strong applications to the ducts after they are slit open, for example, carbolic acid and tincture of iodine, half and half.. The slitting open and treatment of Skene's ducts may be done under cocaine anesthesia. In some cases there are other chronically infected areas that need painful treatment requiring a general anesthetic (extirpation of a vulvo-gland or dilatation and curetment of the uterus or excision of infected cervical tissue), and the urethral ducts may be taken care of at the same time.

In Vaginal Vault. Persistent inflammation at the vaginal vault is due usually to an irritating and infective discharge from the cervical canal. The chronic uterine infection may be located in the cervix or in the body of the uterus. The treatment of these conditions will be found under inflammatory diseases of the uterus (see chapter VI.).

Occasionally there will be persisting inflammation of the vaginal vault without involvement of the cervical canal, the cervical discharge being practically clear mucus, though considerably increased in amount by the hyperemia.

Whether the inflammation at the vaginal vault exists alone or is secondary to chronic gonorrhoeal endocervicitis or endometritis, it requires treatment. There are two methods of treatment—the glycerine-tampon treatment and the dry treatment.

1. GLYCERINE-TAMPON TREATMENT. Introduce the speculum, expose the cervix and vaginal vault, cleanse the surfaces with an antiseptic solution, and treat the interior of the cervix if it requires treatment. Cleanse the surfaces again and dry them and then apply a 25% argyrol or 10% protargol or 10% silver nitrate solution to the vaginal vault and vaginal surface of the cervix.

Wipe out the excess of fluid and then apply an absorbent-cotton tampon with the inner end soaked in 10% ichthyol-glycerine or 10% protargol-glycerine. It is supposed that the glycerine, by its hygroscopic action, helps to work the deeper gonococci towards the surface, where they may be acted on by the antiseptic.

The tampon should be packed in rather firmly, so as to stretch the vaginal wall. This firm packing of the vaginal vault, smooths out the wrinkles and brings the gonococci nearer the surface. It has much the same effect that the passage of a large-sized sound has in chronic gonorrhoeal urethritis in the male.

This firm tamponade of the upper part of the vagina is best applied with the patient in Sims' posture or in the knee-chest posture.

If there is much uterine discharge, this tampon must be removed by the patient in 8 to 12 hours, and the antiseptic douches continued until she returns in two or three days for the next treatment.

If the uterine discharge is slight, the tampon may be left in 24 hours, and then removed and the douches continued until the next treatment.

If there is decided infiltration and thickening of the vaginal wall, it may be advantageous to use 25% ichthyol-glycerine on the tampon, for a few times. This causes desquamation of the superficial layers of the vaginal mucosa, thus bringing the medicine closer to the bacteria, and permitting better penetration of the affected tissues by the medicine.

2. DRY TREATMENT. Expose the vaginal vault with the speculum, cleanse the surfaces, treat the interior of the cervix, if it needs treatment, and cleanse the surfaces again. Dry the vault well and apply the 25% argyrol or 10% protargol or 10% silver nitrate to the affected surfaces.

Apply this thoroughly and let it soak into all the fine depressions. Then dry the wall again and dust in a large amount of some astringent-antiseptic drying powder. I use a powder composed of tannic acid (1 part), xeroform (1 part) and boric acid (3 parts). This is put in freely with the powder-blower.

For throwing powders in large quantity into the upper part of the vagina, I find the ordinary 8-ounce Politzer-bag very convenient. The tip is unscrewed, the bag filled about one-third full of the powder and the tip screwed on again. Now, by tipping the bag, the powder runs into the tube, and little or much, as desired, may be thrown to the top of the vagina. If the tube clogs with powder, turn the tube end up and tap the bottom of the bag on some solid surface. This jars the powder out of the tube and clears it for use. Of course, if the powder gets damp, then the tube must be cleansed with an applicator, and possibly the bag emptied and fresh powder put in.

After the powder has been dusted into the vagina, then a good-sized cotton or wool tampon is spread at its upper end and a quantity of the same powder placed in the depression, and the tampon carried to the vaginal vault. One or two smaller ones may be packed below it to hold it well in place. This constitutes a "dry treatment."

If there is but little discharge from the cervix, this tampon may be left in place for two days, the patient returning then to have it renewed. In such a case the powder should be dusted in freely between the tampons, in order to have a strong antiseptic effect and prevent decomposition during the two days that the tamponade is in place.

When the patient returns the tamponade is removed, the vagina thoroughly cleansed and another dry treatment given.

These are continued until the vaginal wall has apparently returned to a normal condition, then the treatment is stopped and the case watched.

Examinations, to determine the amount of discharge and the condition of the vaginal vault, are made at intervals of a week or so, and also microscopic tests of any discharge that appears.

In a case where there is much uterine discharge, the tamponade must be removed in 24 hours and antiseptic douches continued until the patient returns for the next treatment. In such a case the tampons must be arranged with strings so that the patient may remove them easily. This modified dry treatment is very useful in cases where an endocervicitis is being treated at the same time. However, in the cases of persistent uterine discharge, it is useless to continue this treatment except as a palliative measure. As long as the infective uterine discharge continues, there will necessarily be irritation of the vaginal vault. In such a case, effective treatment for the chronic uterine inflammation is the important matter.

In Cervix and Corpus Uteri. Gonorrhoeal inflammation of the uterus is considered in chapter VI.

Gonorrhoea in Children.

Gonorrhoeal inflammation in female infants and children is more frequent than is generally supposed. In any case of severe or persisting discharge from the scopic examination should be made in order to establish the presence onorrhoea.

In infants and children the process is more likely to be confined to the externa genitals, for usually there has been no penetration into the vagina by the infectin agent. Some of these cases are due to rape, but probably the most of them ar due to accidental contamination from soiled clothing or closet-seat or from th fingers of the mother or attendant.

The principles of **treatment** are the same as for the adult—namely, frequent cleansing, the use of a reliable gonocide preparation and the exercise of care not to carry the infection higher than the surfaces already involved.

Particular care should be taken to instruct the mother as to frequent cleansing of the parts with warm water or with a mild antiseptic wash and as to keeping the parts covered to pervent contamination of the clothing by the discharge. Argyrol is an excellent gonocide for use in these cases, as it causes little or no pain. Start with a weak solution (5%) and advance to the stronger (25%) as the patient becomes accustomed to it. If the vagina is involved, the washing out, and also the application of the gonocide, may be carried out through a small soft-rubber catheter.

SIMPLE VULVITIS.

Simple vulvitis is superficial inflammation of the external genitals due to irritation or to infection with ordinary pus germs. Sometimes it takes the form of scalding or chafing.

Etiology.

The predisposing causes of simple vulvitis are poor general health, and local conditions which cause pelvic congestion, for example, pregnancy and pelvic tumors.

The exciting causes are as follows:

1. **An irritating vaginal discharge.** In the various forms of acute vaginitis and acute endometritis, the discharge alone may be sufficiently irritating to cause pronounced vulvitis.

In chronic vaginal discharge there may be considerable itching, and the consequent scratching and friction is principally responsible for the inflammation. In children this is a very frequent cause of troublesome and persistent vulvitis.

2. **Irritating urine.** Diabetic urine may cause vulvar irritation with resulting chronic inflammation and thickening of the tissues. In this condition there is a brawny induration with sometimes considerable enlargement. Other substances in the urine, such as pus, or high concentration of the urine, may cause irritation leading to scratching and consequent vulvitis.

3. **Parasitic affections.** In pediculosis pubis, the pediculi are located about the pubic hairs, where they cause much itching and irritation and may lead to vulvitis. Ascarides (the thread-worm from the rectum) may cause severe scratching and vulvitis. In persistent vulvitis in children without apparent cause, the stools should be examined for the presence of the thread-worm or "seat-worm" as it is sometimes called.

4. **Masturbation.** Friction from masturbation may lead to inflammation of the external genitals. There is usually some irritant that first causes scratching and the masturbation is an after-development. In children this may lead to se-

vere vulvitis. In older persons it more frequently causes simply hypertrophy of the labia minora.

5. **Lack of cleanliness.** In exceptional cases, this alone may act as a cause, but usually it serves only to aggravate the irritation due to some of the other causes mentioned.

6. **Acute exanthemata.** In eruptive diseases, the same process that affects the skin elsewhere may effect the vulva where, on account of the local heat and moisture, there may result much irritation and inflammation.

Pathology.

In acute vulvitis there are the usual signs of inflammation, the intensity of the signs depending on the severity of the process. If very severe or if there has been much scratching, there may be denuded areas discharging serum or pus. If the inflammation has been present a long time and is consequently in the chronic stage, there is cellular infiltration of the tissues, with induration and discoloration and frequently considerable hypertrophy.

Symptoms and Diagnosis.

The symptoms are itching and burning and heat about the genitals, with redness, swelling and discharge. There may be many abrasions due to scratching, and also small ulcers from the same cause. Often there is burning on urination and increased frequency of urination. In the chronic stage, the secondary conditions just mentioned under pathology are noticeable.

Gonorrhoeal vulvitis is distinguished by the characteristics mentioned under gonorrhoea. In this connection it must be kept in mind that simple vulvitis may, in exceptional cases, lead to simple urethritis in the patient and even in her husband.

Treatment.

After determining certainly that gonorrhoea is not present (for it requires more active measures) proceed with the treatment of the simple vulvitis as follows:

1. **Secure cleanliness.** The parts should be washed several times daily with a carbolic solution or other mild antiseptic solution.

℞ Acid Carbolici
Glycerini, aa 90 c.c.
Sig. Teaspoonful to a pint of water. Use as a wash several times daily.

Small balls of absorbent cotton are very convenient for applying the wash to the surface and for removing the discharge. This keeps the parts clean and to some extent relieves the itching. After each washing, the parts should be thoroughly dried and then kept dry by being dusted freely with some drying powder, for example, stearate of zinc or bismuth subgallate or bismuth subnitrate or boric acid or equal parts of bismuth subcarbonate and prepared chalk or one of the numerous preparations of "talcum powder" prepared for toilet use. The inflamed surfaces should be kept separated by a pledget of cotton placed between them and renewed as soon as it becomes wet with the discharge.

2. **Remove the cause.** If the vulvitis is due to a discharge from vaginal or uterine disease, the nature of the disease must be determined and appropriate treatment, as described elsewhere, employed. In the case of uterine disease, if the discharge can not be checked at once it may be kept from irritating the vulva by tampons placed against the cervix and renewed often enough to absorb the discharge.

In children there is often what seems to be simply loss of tone with excessive secretion, giving a vaginal discharge. If this condition does not yield to tonic treatment and external cleansing measures, the treatment described for vaginitis in children should be employed (see page 415).

If diabetes or other marked urinary disturbance is present, it will be discovered in the urine analysis, and must be given suitable treatment. In pediculosis pubis, a few inunctions of oleate of mercury will kill the parasites. If ascarides cause the trouble, give the following enema every other day until the worms disappear.

℞ Infus. Quassiae, 120 cc.
Sig. Four tablespoonfuls to a pint of warm water. To be used as a rectal injection, as directed.

In masturbation, remove all local irritation, keep the genitals cleansed, give bromides to diminish the irritability of the sexual center and, if necessary, appeal to the reason and pride and fear of the child or adult, as the case may be, to prevent the continuance of the habit.

3. **Make sedative or astringent applications.** If the inflammation is acute and accompanied by burning and itching, not relieved by the cleansing measures, the lead and opium wash (see Formulæ) may be used. A thick layer of absorbent cotton, or a soft cloth, should be soaked in this solution and applied to the genitals after the cleansing with the carbolic wash. The lead and opium mixture may be kept applied to the genitals as long as the severe burning and smarting are present. It usually gives the desired relief. The borax and opium wash (see Formulæ) is another sedative application which is used in the same way. In some cases it may be necessary to apply cocaine solution (4%) occasionally, when the irritation is most marked. A small piece of absorbent cotton wet in the solution may be rubbed over the inflamed areas or applied to them for several minutes. Continuous applications of cocaine solution for any considerable length of time is not advisable on account of the danger of absorption.

In some cases in which an irritating discharge from the vagina or urethra can not be stopped, the surfaces coming in contact with it may be somewhat protected by covering them with zinc oxide ointment. The ointment should be applied each time after the gentials have been cleansed with the carbolic wash and wiped dry. The addition of carbolic acid (2% to 5%) makes the ointment more effective in relieving pruritis. If this does not give relief, cocaine (2% to 10%) may be added.

Astringent and antiseptic applications have a direct effect toward diminishing the disease, and in most cases they can be used from the first. If the inflammation is acute and is accompanied by much discharge, the 25% argyrol solution is beneficial. It should be applied carefully over all the inflamed surface every second or third or fourth day. The zinc sulphate and hydrastis wash (see Formulæ) is a good astringent application which may be applied by the patient.

4. **Internal Treatment.** Administer tonics or sedatives or other internal remedies as indicated by the conditions present. Patients in poor general health should have appropriate tonic treatment. If there is chronic constipation, laxatives should be given. If there is much urethral irritation, as indicated by frequent or painful urination, give the hyoscyamos and potassium citrate mixture (see Formulæ). If the urine is concentrated, direct the patient to drink an abundance of water. Lemonade, not too sweet, is pleasant for a change and helps to make the urine less irritating.

If the patient loses sleep or is made nervous by the vulvar irritation, it is well to administer a mild sedative, such as sodium or strontium bromide.

FOLLICULAR VULVITIS.

Follicular vulvitis occurs in adults. It is characterized by the inflammation being confined principally to the hair follicles and sebaceous glands, the inflamed structures being represented by small red papules scattered over the labia (Fig. 216).

The causes, symptoms and treatment are the same as described under simple vulvitis. This form of vulvitis is prone to become chronic and resist treatment, consequently it should be treated vigorously. The measures mentioned under simple vulvitis (acute and chronic) should be used. Also the following sometimes gives relief.

℞ Liq. Ferri Subsulphatis, 4.
Glycerini, qs. ad., 30.
Sig. Apply two or three times daily with a camels-hair brush.

If pus forms in the follicles, they should be evacuated and then washed out with hydrogen peroxide. If there is much local inflammation, hot compresses wrung out of weak carbolic solution may give much relief.

Follicular vulvitis sometimes appears during pregnancy and disappears spontaneously afterward. In rare cases the irritation has become so severe that it caused abortion.

ERYSIPELAS OF VULVA.

Erysipelas of the vulva, like erysipelas elsewhere, is a rapidly spreading inflammation produced by the streptococcus pyogenes.

Etiology and Pathology. The streptococcus pyogenes, or "streptococcus erysipelatis," as it is sometimes called, enters through a crack or scratch or abrasion or other open place in the protecting epithelium. Once within the subepithelial tissue it multiplies rapidly, causing marked inflammation with a superficial parchment-like induration of the involved surface. There is also inflammatory edema of the deeper tissues, causing marked swelling of the vulva. The inflammatory process spreads rapidly by a well defined margin which is red and slightly raised.

If the inflammation is intense, small vesicles may appear at various places on the surface and rupture, discharging serum. The process may extend up onto the abdominal wall or out onto the thighs or into the vagina.

Symptoms and Diagnosis. In the beginning there is usually a chill, followed by considerable fever and the general disturbance usually associated with fever. The patient complains of heat and throbbing in the external genitals. The fever continues and swelling of the vulva is noticed. The patient then comes for examination, which reveals the condition described under pathology. Later, pus may form. In the diagnosis, differentiate from scarlatinal rash on vulva, from intertrigo, from bichloride rash, from cellulitis of vulva and from hematoma.

Treatment. Considerable relief will be afforded by applying pieces of absorbent cotton, or gauze, soaked in carbolized olive oil (1 to 2%). The exclusion of air seems to diminish the burning. The application of an ice-bag outside the oil dressing, tends to check the pruritis and the swelling. The bowels should be moved well. If the fever is high, it may be reduced by cool sponge-baths or by some of the reliable antipyretics. Quinine in moderate doses and tincture of the chloride of iron in large doses are time-honored remedies for infective processes. An abundance of water should be given to help the skin and kidneys in elimination. If the patient is weak, strychnia and other stimulants and tonics are indicated.

In serious cases, some reliable antistreptococcus-serum should be used freely. I have much confidence in Stearn's streptolytic serum, which I have used with satisfactory results several times. In a recent puerperal case of rapidly spreading erysipelas of the breast, with a temperature of 106°, the process was promptly checked by the free administration of this serum. On the other hand, in some cases, the serum has no apparent effect. The "opsonin" treatment elaborated by Wright, promises to be of benefit in all infective processes, but it is still in the experimental stage.

Unguentum Crede is an excellent local application for the inflamed area. Other local applications, found by experience to be more or less effective, are the bichloride ointment (see Formulæ), carbolized liquid vaseline (5%) painted over the surface with a camels-hair brush, ichthyol and glycerine equal parts or ichthyol and vaseline equal parts.

Subcutaneous injection of various antiseptic solutions at the spreading margin, has been recommended. But this gives the patient considerable pain, and the results are uncertain and not encouraging.

If collections of pus form, they should be incised and the cavities washed out with hydrogen peroxide and drained.

PHLEGMONOUS VULVITIS.

Phlegmonous vulvitis is that form in which the bacteria (usually the staphylococcus pyogenes aureus or albus) penetrate to the subcutaneous connective tissue and cause inflammation there. It is known also as "cellulitis" of vulva and as "lymphangitis" of vulva. It lacks the superficial parchment-like induration of erysipelas.

Etiology and Pathology. Anything that causes an abrasion about the vulva, through which bacteria may reach the connective tissue, may lead to phlegmonous vulvitis. Any of the previously mentioned forms of vulvitis may be followed by this form. Injuries to the vulva or furunculosis, may lead to the same. The pathological changes are the same as in phlegmons elsewhere. There is marked inflammation of the connective tissue and of the lymph channels. Resolution may take place or the process may go on to suppuration. Occasionally suppuration of the inguinal lymphatic glands occurs.

Symptoms and Diagnosis. The symptoms are those of simple vulvitis with the addition of pain and swelling, indicating deeper inflammation. Sometimes there is considerable fever, but not always. The swelling may be very marked, the inflammatory exudate sometimes distending certain structures almost beyond recognition.

It may be confounded with hematoma of vulva. The latter is distinguished by the sudden onset following some injury or slight surgical procedure, for example, the introduction of a hypodermic needle for the purpose of drawing off fluid from a cyst. The hematoma begins within a few hours after the injury and increases rapidly in size, with pain but no fever. The distinctive signs of acute inflammation are absent. Hematoma sometimes occurs in pregnancy without injury, being due to subcutaneous rupture of a varicose vein.

When a phlegmonous vulvitis is confined to one side, it may resemble pudendal hernia or pudendal hydrocele. In each of these affections, acute inflammation is absent at first and, also, there are special characteristics that indicate the nature of the swelling.

Treatment. The treatment is the same as for cellulitis or lymphangitis elsewhere. The patient should stay in bed, and hot compresses, made by wringing absorbent cotton out of hot water or weak carbolic solution, may be applied to relieve the pain and limit the inflammation. If there is much superficial irritation it may be diminished by the measures given under simple vulvitis.

Pelvic congestion should, as far as possible, be overcome by laxatives and other measures as indicated. Hot sitz-baths sometimes give decided relief. If the inflammation is severe and spreading rapidly, it may be advisable to make several incisions through the involved area, such as are made for severe spreading subcutaneous inflammation in other localities. If an abscess forms, it must be opened and drained.

GANGRENOUS VULVITIS.

This is known also as **noma.** It is inflammation of the vulva of such severity that the nutrition of the structures is cut off and they become gangrenous. Extensive sloughing may take place.

Gangrenous vulvitis occurs almost exclusively in patients in whom the normal tissue resistance has been destroyed by exhausting general or local diseases. Local conditions interfering with the pelvic circulation, such as pregnancy and pelvic tumors, predispose to this affection.

Its most frequent victims, however, are children who are poorly nourished and poorly cared for. In such it is often fatal. The exanthemata, particularly when occurring in sickly children, may cause gangrenous vulvitis.

The **treatment** is the same as for phlegmonous vulvitis, with the addition of tonics and stimulants, as indicated by the patients general condition. In some cases it may be advisable to excise the gangrenous tissue and cauterize the remaining wound. The ulcerated surfaces remaining after the sloughs separate, require the regular treatment for ulcers of the vulva.

DIPHTHERITIC VULVITIS.

Diphtheritic vulvitis, like diphtheritic vaginitis, is simply diphtheria with anomalous location of the membrane, and requires the regular treatment for diphtheria, namely, antitoxin, stimulants, nourishment, and local measures to keep the infected surfaces clean and hasten removal of the membrane. It is rare, and is due to the same cause as diphtheritic vaginitis.

ECZEMA OF VULVA.

Vesicular eczema of the vulva is most frequently located on the labia majora. The vesicles break and form crusts, and an itching, inflamed discharging surface persists. Chronic erythematous and squamous eczema also may occur, in which case the skin is infiltrated and may become nodular. The eczema may be limited to the vulva or it may extend to the adjacent cutaneous surfaces or into the vagina.

Causes and Symptoms. The predisposing causes are the same as predispose to eczema elsewhere, namely, general nutritive disturbances characterized by gastrointestinal disorders or rheumatism or gout. The local nutritive disturbances accompanying the menopause seem to predispose to eczema of the vulva. The exciting cause is usually some local irritation, such as vaginal discharge, diabetic urine and other causes of irritation mentioned under the etiology of simple vulvitis.

The symptoms of eczema of the vulva are practically the same as of eczema elsewhere, i. e., burning, itching, infiltration and induration, with some thickening of the parts and frequently a discharge.

Treatment. The indications for treatment are to allay the local irritation and correct as far as possible the general nutritive disturbances, as in the treatment of eczema in other localities. Alcoholics, spices and highly seasoned foods must be forbidden. In acute eczema of the vulva, the measures recommended under acute vulvitis may be employed. The lead and opium wash gives much relief, or the calamine and zinc lotion (see Formulæ) may be used. A soft cloth may be wet in this lotion and applied to the parts, being held in place by a T-bandage. If the irritation is marked, keep the cloth constantly wet with the lotion. Another way of applying the lotion, where the irritation is not so great, is to mop it over the parts and allow it to dry and form a protective coating.

As a cleansing agent, hydrogen peroxide is exceedingly useful and may be applied in all stages of the disease, either diluted with one or two times its volume of water or used full strength. Another excellent application in acute eczema of this region is the "black wash" (see Formulæ). This is mopped freely on the parts for several minutes and then allowed to dry. It forms a protective sediment, over which may be applied a sedative ointment. This application may be repeated every few hours. During the acute stage, a soothing ointment such as the zinc oxide and carbolic ointment (see Formulæ) is useful, particularly if the patient has to be up and about, This may be applied each time after the application of one of the lotions above mentioned. Another useful application in the acute form is the oxide of zinc emulsion in almond oil (see Formulæ).

In the subacute and chronic cases, and these are the most frequent, the diachylon ointment (equal parts of emplastrum plumbi and vaseline melted together) may be used with much benefit. In the more sluggish cases, emplastrum plumbi undiluted may be used. Cleanse the affected surface thoroughly with green soap and cotton balls, dry it and then apply diachylon ointment spread on gauze or better still, small strips of bandage muslin. This dressing should be held firmly against the surface by a T-bandage. The ointment should be kept applied continuously for several days, no water being used locally except what is absolutely necessary for cleanliness. In four or five days the cleansing with green soap may be repeated to be followed by the application of the ointment. If the eczematous process is sluggish and more stimulation is required the diachylon plaster (emplastrum plumbi) may be used full strength, applied on muslin the same as the ointment.

Tar ointment is still more stimulating to the skin and sometimes gives better results than the diachylon treatment. It is indicated in the dry scaly forms and should be applied tentatively as, in some persons, it produces too much irritation. Begin with a preparation containing a small amount of tar (see Formulæ). If this produces no irritation and a stronger stimulant is needed, the quantity of tar may be doubled and later quadrupled. The tar ointment may be applied on strips of muslin or the patient may rub it into the surface with the fingers. Some think the rubbing in of the ointment makes it more effective. Tar ointment is not indicated when there is deep infiltration. It is most useful in the superficial chronic scaly form.

When pruritis is marked, the application of hot water for a short time, followed by the application of an ointment, sometimes gives much relief. The ointment to be used should be at hand ready for application. Then a cloth wet in very hot water is applied to the involved area and held there for a few minutes until it begins to cool. The surface is then dried with a soft cloth or cotton and the ointment applied at once.

An occasional application of silver nitrate solution (4% to 10%) is of decided benefit in some cases.

In the very chronic cases, one plan of treatment is to go over the surface with the sharp curet and, following the curetment, to rub into the surface a 3% solution of salycilic acid in alcohol and then apply the diachylon ointment spread on muslin. In place of the curet the affected area may be scarified with a knife, the scarifications being made deep enough to cause considerable exudate and bleeding, which may be further promoted by the application of hot water for a short time. Then the parts are dried and the salycilic acid in alcohol applied, followed by the diachyon ointment.

INTERTRIGO.

Intertrigo is a hyperemic condition of the skin, with slight maceration and consequent irritation. The patients usually refer to it as "chafing" or "heat." It is due to prolonged contact and friction of opposed surfaces. The normal skin secretions are retained between the approximated surfaces and become decomposed and irritating. It occurs most frequently in stout women and in infants, because in them the skin surfaces are in contact more constantly and over a wider area. It is usually worse in hot weather because the skin secretions are increased then, and also because the additional heat hastens decomposition. Intertrigo in this region may be caused or, if present, may be made worse, by anything that acts as an irritant to the skin, for example, vaginal discharge, uncleanliness and the various etiological factors mentioned under Acute Vulvitis.

The process may affect any surfaces kept in apposition. It is usually located in the genito-crural creases, but may spread inward over the labia or outward over the thighs and upward on the abdominal wall. At first, intertrigo consists simply of hyperemia and slight irritation of the skin, but after a time there is considerable serous and cellular infiltration, with thickening and fissures and pigmentation. Infection may take place through some of the fissures or abrasions, and the result is an acute inflammation of the skin.

Intertrigo gives rise to a great deal of burning and itching and discomfort, frequently to such an extent that walking causes much distress. When the irritation is marked, there is a serous secretion from the surface, which adds to the patient's discomfort and to the local irritation by soiling the adjacent portions of the clothing. Clinically the dividing line between intertrigo and eczema is not distinct.

Treatment. Secure cleanliness by the frequent application of the carbolic wash or a strong solution of baking soda (tablespoonful to a pint of water). After each washing, the parts should be carefully dried and then dusted freely with some drying and antiseptic powder, for example, the zinc oxide and magnesium carbonate powder (see Formulæ). Other drying powders are mentioned under Acute Vulvitis and also under Pruritis Vulvae. After the application of the powder, a piece of cotton or gauze should be placed so as to keep the affected surfaces from coming in contact.

The cleansing and dusting must be done from three to six times daily, i. e., frequently enough to keep the surfaces clean and dry. If the patient can rest in bed for a few days, the surfaces may be covered and kept separated by pieces of gauze wet in the calamine lotion (see Formulæ).

The treatment is much more effective when the patient can be kept quiet and in bed. If she is obliged to work during the day, frequent washings, of course, can not be employed, and it is then advisable to prescribe a sedative ointment such as the zinc oxide and carbolic ointment (see Formulæ) to be applied between the applications of the lotion. The surfaces must be kept separated by a soft cloth or cotton

In chronic cases, some of the stimulating ointments mentioned under Eczema are beneficial. Eczema may develop over an area of intertrigo, and in that case the treatment given under Eczema is required.

Ravogli recommends the following measures for intertrigo. When the surface is excoriated and there is considerable secretion, keep the patient in bed and apply Burow's solution (see Formulæ) in strength of 3%, on strips of lint, which serve to keep the surfaces apart. This usually causes the intertrigo to disappear after a few applications.

If the patient must work, then the bathing with the above solution may take place morning and evening, while during the day some sedative ointment may be applied to the surfaces, which should be kept separated with soft lint. In chronic intertrigo with papillary hypertrophy, make two or three applications of Wilkinson's ointment (see Formulæ) which causes desquamation of the old epidermis, with consequent development of new soft epidermis. The resorcin and salicylic acid ointment (see Formulæ) has been found effective in some cases.

To prevent relapses, it is well to wash the creases in the genito-crural region very frequently and keep them dusted with starch powder containing 2% of boric acid or salicylic acid, or with some other suitable dusting powder.

HERPES OF VULVA.

Herpes may occur on the vulva, where it is known also as "herpes progenitalis." The vesicles of the herpetic eruption are usually of larger size than those of vesicular eczema. Furthermore, they occur in groups and do not rupture easily, whereas the vesicles of eczema rupture spontaneously, causing a sticky discharge. Herpes is seldom accompanied by the intense burning and itching which characterize eczema. Herpes occurs especially in nervous women, particularly when there is marked pelvic congestion from any cause. With some women it occurs at nearly every menstrual period.

The discomfort from uncomplicated herpes is so slight that not much treatment is required. The parts should be kept clean and dry and may be dusted frequently with some drying powder, for example, equal parts of zinc oxide and prepared chalk. All irritation should be avoided. If there is troublesome pruritis or burning or smarting, a sedative lotion or ointment may be used. The erosions left by rupture of the vesicles should not be cauterized, as it is not necessary and may cause deep ulcers.

PRURIGO OF VULVA.

This is a rare disease of the skin, beginning usually in early childhood and reappearing in later life at irregular intervals and sometimes continuing for long periods. It is characterized by a papular eruption and very troublesome itching. The papules are at first of the color of the skin and are more readily felt than seen, giving, on palpation, a rough "goose-skin" sensation. Later there are various secondary changes (abrasions, pigmentation, desquamation and decided infiltration and thickening) due to the scratching excited by the severe pruritis. The pathology of the disease is somewhat in doubt, some authorities holding that it is a neurosis and others holding that it is dilatation of the lymphatics, causing irritation of the nerve filaments of the skin. The disease is usually limited to the extensor surfaces of the arms and legs, the genitals being rarely affected. When it does affect the genitals, it causes troublesome and persistent pruritis, helping to swell the list of cases of "pruritis vulvae."

In the **treatment,** the patient's general health should be put in the best condition. The irritability of the nervous system should be reduced by the administration of sedatives, such as bromides or cannabis Indica. The pruritis is diminished in some cases by tincture of cannabis Indica by the mouth and also by pilocarpine hypodermatically. Locally, an ointment containing menthol or both menthol and chloroform, may give much relief (see Formulæ). Also the salicylic acid and creosote ointment (see Formulæ) has proven useful. If the itching is severe and persistent in spite of the ointments mentioned, cocaine suppositories may be used for temporary relief. The cocaine suppository is to be introduced into the vagina when the itching is severe, and as the suppository melts the medicine becomes distributed over the affected surfaces. Other remedies for the itching may be found under Pruritis Vulvae. Ether and alcohol (1 to 4) and also chloroform and alcohol (1 to 4) have been recommended for the purpose of dissolving out the tenaceous masses at the bottom of the papillae.

PARASITIC DISEASES OF VULVA.

The parasitic diseases, pediculosis and scabies, occur here as elsewhere on the body surfaces. They give rise to much irritation and, unless search is made for the parasites, the patient may be treated ineffectually for a long time for the resulting pruritis and irritation.

Pediculosis Pubis.

This is the most common parasitic disease of the vulva. The pediculus pubis or "crab louse" (Fig. 482) differs from the pediculi found on other parts of the body. It inhabits the pubic hairy region and may give rise to much irritation. It is conveyed from one person to another by contact, usually in sexual intercourse.

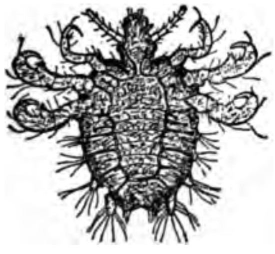
Fig. 482. The Pediculus Pubis, magnified. (Stelwagon—*Essentials of Skin Diseases*)

There is itching and consequent scratching, with resulting abrasions and vulvitis. The diagnosis is made by finding the parasites (Fig. 482), which are attached to the hairs near the skin. At first they may not be noticed, but on close inspection they are seen as small brownish particles attached to the hairs very close to the skin.

The **treatment** is to apply oleate of mercury (10%) once daily, rubbing it well into the hairy region. After the remedy has been applied for four or five days it may be washed off, and need not be applied again unless there develop evidence that some of the parasites escaped destruction. At the end of the treatment, a soap and water bath and complete change of underclothing must take place. An elegant and effective preparation used in the same way is Kapozi's petroleum salve (see Formulæ). Some recommend to shave the pubis or to clip the hair there, but that is usually not necessary. If there is much local irritation remaining after the parasites are killed, the measures given under Simple Vulvitis may be employed.

Scabies.

Scabies may appear about the external genitals as part of an extensive development of scabies, the infection usually appearing first on the fingers. There are the usual symptoms—severe itching, worse when the body is warm, and the abrasions and irritation resulting from scratching. The diagnosis is made by finding the burrows of the itch-mite on other portions of the body, usually on the fingers.

The **treatment** consists of a warm soap-water bath followed by the free use of a sulphur ointment (see Formulæ). Immediately after the bath, the patient should rub the ointment thoroughly into all the infected areas, and put on clean underclothing. The inunction should be repeated night and morning for three days, the same underclothing and same bed linen being used during the course. On the fourth day a warm soap bath should be taken and clean underclothing put on. If some irritation of the skin remains, a mild ointment, such as zinc oxide ointment or carbolized vaseline, may be used for a few days. If any of the burrows, containing the ascarus scabiei, escape the first unction course, another similar course must be carried out.

SIMPLE VAGINITIS.

Simple vaginitis is inflammation of the vagina due to irritation or to the ordinary pus germs. It is known also as "catarrhal vaginitis."

Etiology. The normal vaginal secretion is destructive to the ordinary pus germs and tends to protect the vaginal wall, as well as the cervix uteri, from infection. Anything that lowers the nutrition of the vaginal wall interferes also with the protective action of the vaginal contents and hence predisposes to inflammation. Wasting diseases of every kind have that effect to some extent, but it is especially noticeable in those conditions causing congestion of the vagina, such as pelvic tumors, pelvic inflammatory affections, pregnancy and heart disease. In the presence of any of the predisposing causes, and sometimes without them, vaginitis may be produced by the following causes:

1. Use of an infected syringe-nozzle or syringe, carrying staphylococci or streptococci into the vagina. Ordinarily these germs are killed by the vaginal contents, but in cases in which the nutrition of the vaginal wall is disturbed and the resistance consequently lowered, these germs may multiply rapidly and cause severe vaginitis.
2. An infective uterine discharge, for example, in acute septic endometritis.
3. Decomposition of a chronic uterine discharge. Ordinarily a chronic discharge from the uterus passes out of the vagina, causing only slight irritation, but if it is retained long in the vagina, decomposition takes place, causing marked irritation and vaginitis.
4. Use of strongly irritating substances in the vagina, for example, where a too

concentrated douche solution is used by mistake, or where some irritating substances are introduced into the vagina for the purpose of causing an abortion.

5. Foreign body in the vagina. A pessary worn too long or without proper precaution may cause severe local vaginitis, extending even to ulceration. In some cases of this character it has happened that the ulceration has extended deeply into the vaginal wall. Kelly illustrates a case in which ulceration took place with so much resulting cicatricial contraction below the pessary, that the vagina was occluded and a collection of pus formed above the point of occlusion. Foreign bodies introduced for the purpose of masturbation are liable to cause vaginitis.

6. In sexual intercourse, germs, other than the gonococcus, may be carried into the vagina, and, if the soil is favorable, simple vaginitis will result. Again, slight traumatisms in difficult coitus furnish an entrance for germs, with resulting vaginitis.

7. In the exanthemata—measles, scarlet fever and the other eruptive diseases—the eruptive disturbance may extend to the vagina, causing much irritation and, as a consequence, vaginitis.

Pathology and Symptoms. The inflammatory phenomena are the same as in gonorrhoeal vaginitis, except not so marked. The vaginal walls present active congestion. They are red and hot, and manipulations cause pain. At first the secretion is slight, but very soon it is increased and becomes purulent. There is a serous and cellular exudate into the vaginal wall and the superficial layers of epithelium are thrown off and form part of the discharge.

In chronic cases the acute symptoms have disappeared but the cellular infiltration and epithelial exfoliation persist. The papillae may become especially swollen, giving the sensation of a rough granular surface. The longer the process continues, the deeper the infiltration extends.

In acute vaginitis usually the first symptoms are dryness, heat and itching in the vagina and about the vulva. Later, a discharge appears with consequent irritation about the vaginal orifice and the meatus. The vulvar irritation and the urinary disturbance are usually not nearly so marked as in gonorrhoea. General disturbances are slight. The patient feels somewhat feverish, but decided rise of temperature is rare, and when present should arouse suspicion of complications.

Diagnosis. The fact that the vagina is inflamed can be directly demonstrated in the examination, so it remains only to distinguish simple vaginitis from the other forms of vaginal inflammation..

GONORRHOEAL VAGINITIS is distinguished by the following:

a. Inflammation is rapid in development and severe.

b. Involvement of urethra and vulvo-vaginal glands.

c. No other apparent cause.

d. Gonococci in the discharge.

e. History of suspicious coitus within a few days before the beginning of the trouble. In exceptional cases a simple vaginitis may give rise to a simple urethritis in the husband. But simple vaginitis never gives rise to a gonorrhoeal urethritis, as some husbands endeavor to make out.

DIPHTHERITIC VAGINITIS is distinguished by:

a. Development of a false membrane on the vaginal wall.

b. Marked systemic effects.

c. Presence of diphtheria bacilli, as demonstrated by bacteriological examination.

Adhesive Vaginitis presents the following characteristics:

a. Inflammation is only chronic or subacute.

b. Occurs in patches, resembling abraded areas.

c. Walls of vagina adhere, and separation of the adhesions causes a bloody discharge.

d. Patient is usually past the menopause.

Treatment. In the severe cases the same treatment is indicated as in gonorrhoeal vaginitis. Usually, however, the inflammation is comparatively mild, and an antiseptic douche, such as bichloride 1-5000, two or three times daily, is all that is required. The cause must be sought and removed, for example, if it is due to an irritating discharge from the uterus, the uterine lesion must receive appropriate treatment. If the vaginitis becomes chronic, the treatment described under Chronic Gonorrhoeal Vaginitis should be employed.

Simple Vaginitis in Children.

In children a troublesome discharge sometimes appears and gives rise to much vulvar irritation. The trouble is frequently not severe enough to be called inflammation of the vagina—there seems to be simply an excess of secretion, causing a vaginal discharge. But the vulvar irritation, which is the most marked symptom, often necessitates measures to stop the excessive secretion. The **treatment** of this affection consists in keeping the external genitals clean and dry by washing frequently with a weak carbolic solution, then drying with absorbent cotton and then dusting with a drying powder, such as boric acid powder. Bismuth subnitrate and prepared chalk, equal parts, is also a good dusting powder. Keep the vulva covered with a pad of absorbent cotton.

The child should be put in first-class general health. Often the patient presents lowered vitality and anemia and a general relaxation or want of tone in the tissues —the so-called strumous diathesis. In such a case, a course of tonic treatment, restoring the patient's vitality, will often cause the discharge to cease. If the discharge persists, a mildly astringent vaginal suppository may be introduced into the vagina once daily (see Formulæ).

Of course, in severe vaginitis in children, the vagina should be irrigated, much the same as in adults, but in the mild disturbance here described vaginal irrigation is rarely necessary. When it is necessary, the vagina may be carefully washed out once or twice daily with the carbolic or other douche solution, using a small soft-rubber catheter instead of the ordinary douche-nozzle.

PARASITIC VAGINITIS.

Parasitic vaginitis is the term applied to inflammation of the vagina due to the same fungus which causes thrush in the mouth. It is known also as "mycotic vaginitis" and as "aphthous vaginitis."

The cause is invasion of the vagina by parasites of the order of oidium albicans, or, perhaps more correctly, saccharomyces albicans. The infection is carried to the genitals usually by the fingers of the patient, who has been handling some organic substance on which the fungus was growing. A mother whose baby is suffering with thrush may infect herself. It usually occurs in nursing women or in pregnant women or in cases of prolapsus uteri. It is said to occur sometimes as the result of sexual intercourse with a diabetic husband.

The pathological changes are practically the same as in thrush in the mouth. There are white patches, representing the growing fungus, and accompanying inflammation of the adjacent tissues. The patient complains of burning, itching or smarting, but there is not much discharge. In the examination through the speculum, the vaginal wall presents the ordinary evidences of inflammation and in addition it is studded with small white patches about the size of a pin-head. In some cases small ulcers may form. A scraping from one of the white patches, examined with a microscope, will show the fungus (Fig. 483).

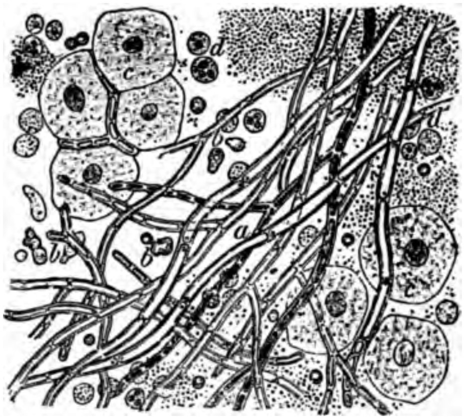

Fig. 483. The Thrush Fungus, under the microscope. (Holt—*Diseases of Children.*)

Treatment. Douches will give some relief, but must be supplemented by application through the speculum of a more concentrated antiseptic, such as argyrol 25% or protargol 10% or silver nitrate 5% or bichloride solution (1-500). After the application, dust powdered borax into the vagina and then introduce a tampon wet in 50% boroglyceride. Such treatment, given every day or every other day for several days, usually stops the disease promptly. After the fungus has been destroyed, mild antiseptic douches are required for a time for the accompanying simple vaginitis.

DIPHTHERITIC VAGINITIS.

This form of vaginitis is due to infection of the vaginal wall by diphtheria bacilli. It is rare. It is liable to occur when there is diphtheria in the house, if there are abrasions of the vagina, particularly after labor.

Diphtheritic vaginitis is characterized by the development of a false membrane over the abraded areas and by the marked systemic effects of diphtheria, in addition to the usual signs of vaginitis. Streptococci sometimes cause a membrane. The differential diagnosis is made by the surrounding inflammation and the systemic disturbances in the two diseases, and especially by a bacteriological examination when that is available.

The treatment should include the measures recommended for simple vaginitis, and, in addition, antitoxin and other remedies indicated in diphtheria.

EMPHYSEMATOUS VAGINITIS.

In emphysematous vaginitis, small collections of gas appear under the epithelium or in the meshes of the connective tissues. It is a rare form of vaginal inflammation and occurs almost exclusively in pregnant women. Its seat is the upper part of the vagina and the vaginal portion of the cervix. The little air vesicles are close set and vary from the size of a pin head to several times as large. They are frequently surrounded by an area of hyperemia, but the inflammatory reaction is slight. When punctured the air escapes and the vesicle collapses. There is rarely any secretion from them. The gas contained in them is, in part at least, trimethylamine. The vesicles show little tendency to reform after puncture. The affection is due to a mild gas-producing bacillus. But it apparently bears no relation to infection with the gas-forming bacillus known as the bacillus aerogenes capsulatus, for this deadly germ gives rise to a severe and rapidly spreading phlegmonous inflammation.

As to the treatment of emphysematous vaginitis, nothing more is usually required than puncturing the air vesicles and washing of the vicinity with an antiseptic solution. If there is an irritating discharge, mild antiseptic douches may be given. If the patient is pregnant, great care must be exercised not to cause much irritation, as an abortion might result.

ADHESIVE VAGINITIS.

Adhesive vaginitis is the term given to that form of vaginal inflammation in which there is a tendency of the opposed surfaces to become adherent. It occurs almost exclusively in women past the menopause, hence the name "senile vaginitis" by which it is often designated. Occasionally it occurs in children. The predisposing cause in most cases is the disturbance of nutrition due to old age. The exciting cause is probably a slight uterine discharge, which macerates the vaginal epithelium and produces considerable irritation. A certain amount of senile vaginitis is very frequent and often produces no symptoms. In fact it is probable that only a small proportion of women over sixty are entirely free from some disturbance of this kind, with slight adhesions here and there.

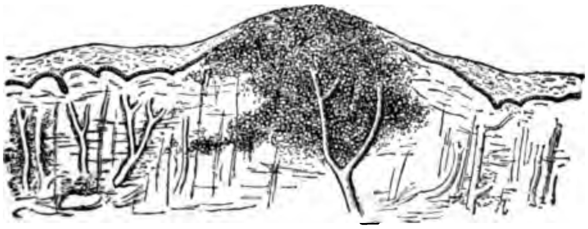

Fig. 484. Indicating the condition in an area of Adhesive Vaginitis. The epithelium is thrown off. The granulating surface left may unite with a similar area on the opposite wall, causing adhesions as described. (Briesky—*Diseases of Vagina.*)

Over irregular patches the superficial layers of epithelium are thrown off (Fig. 484), forming erosions from which there is a scanty secretion. The eroded areas are tender and usually bleed on manipulation.

When such areas develop on opposed surfaces of the vaginal walls, adhesions take place between them. For a long time the adhesion is weak and the surfaces may be easily separated. If the process of adhesion is allowed to go on undisturbed, the adhesions become organized and firm, and in the course of time may become so extensive and strong that the vagina is practically obliterated. Adhesive vaginitis is accompanied by a slight "gluey" discharge, small in amount but irritating.

The **symptoms** are, vaginal discharge, sometimes bloody, with some pain in the pelvis and vaginal burning and discomfort. There may be some burning or smarting on urination, from irritation of the vulva by the discharge.

On digital examination, the vaginal walls are felt adherent in places, especially at the upper portion of the vagina, and the separation of the walls causes some pain and bleeding. Examination of the vagina through the speculum shows hemorrhagic areas of denudation and inflammation, principally in the upper part of the vagina.

Diagnosis. The evidences of subacute vaginitis with marked tendency to adhesion of the walls in spots, establishes the diagnosis of adhesive vaginitis. Vaginitis occurring after the menopause is usually of this form. Be careful to distinguish gonorrhoeal vaginitis from the ordinary adhesive vaginitis. Serious disease of the uterus causing discharge, particularly cancer, must be excluded.

Treatment. If the trouble is slight and causing no symptoms, it needs no treatment. The adhesions in themselves cause no trouble and consequently need no treatment.

When the disturbance gives rise to an irritating discharge or to bleeding or to pain, then the following treatment is indicated:

1. Put the patient in the best possible general health.

2. Keep the vagina free from the irritating discharge by the use of a mild antiseptic douche, such as the carbolic douche, two or three times daily. If the parts are atonic and show a marked tendency to bleed, an astringent douche, such as the alum and zinc sulphate douche (see Formulæ) may be used.

3. Every second or third or fourth day, depending on the severity of the vaginitis, make a vaginal application of some astringent and antiseptic, for example, argyrol 25% or protargol 5% to 10%. This should be applied thoroughly to all parts of the vaginal wall involved in the inflammatory process. If the hemorrhage tendency is marked, an application more strongly astringent, such as copper sulphate solution (10%) may be used.

After the application, some measure should be employed to keep the vaginal walls separated, at least for a time. For this purpose we may use cotton tampons or gauze strips soaked in carbolized glycerine (2%) or covered with carbolized zinc oxide ointment (2% to 5%), or the ointment may be spread on the vaginal walls and then the tampons introduced. Carbolized olive oil (2%to 5%) makes a soothing application to the vaginal walls and prevents adhesion of the opposed surfaces. In very sensitive cases, either almond oil or ungentum aquae rosae may give more relief than the other remedies mentioned. For use at home, between the office applications, astringent vaginal suppositories (see Formulæ) are sometimes beneficial.

4. The exciting cause of the trouble must be sought and, if possible, removed. Frequently it will be found to be an irritating discharge due to senile endometritis, which must, of course, receive appropriate treatment.

SIMPLE ULCERS

OF VULVA AND VAGINA.

Ulcers or ulceration of the vulva or vagina may indicate the following conditions:

1. Simple irritation or pus infection. Any of the numerous irritants that cause vulvitis may cause one or more ulcers, as may also infection at any point with ordinary pus germs.
2. Chancroidal infection.
3. Syphilis.
4. Tuberculosis.
5. Malignant disease.
6. Ulcus rodens vulvae.

Those coming in the first class constitute the simple ulcers.

Pathology and Symptoms. The simple ulcers are the ones considered here—the other varieties will be taken up later. The essential feature of an ulcer is that the epithelial coat is lost down to the connective tissue, the base being covered with granualtion tissue or a slough. The infecting germs lie in the tissues close to the surface of the ulcer, and outside them is a limiting zone of round-cell infiltration. There is more or less discharge from the surface of the ulcer, and it usually bleeds on slight manipulation. These characteristics pertain to all varieties of ulcer. There is some pain and tenderness about the ulcer, and the discharge may cause considerable irritation. If the ulcer is situated so that the urine flows over it, the patient may experience smarting and burning on urination.

Diagnosis. The diagnosis of ulcer presents no difficulties, as it is estabilshed by finding an area devoid of epithelial covering and presenting a granulating surface. An eroded area on the vulva or in the vagina, which is sensitive and bleeds easily, may be mistaken for an ulcer, but close inspection will show that the surface is still covered with a thin layer of epithelium.

The diagnosis of the **variety of ulcer** present is very important and sometimes difficult. From simple ulcer there must be distinguished the chancroidal, the syphilitic, the tubercular and the malignant ulcer.

The **chancroidal ulcer** presents a ragged or irregular base with punched out or undermined edges, and a tendency to spread and also to infect surfaces with which the secretion comes in contact (Fig. 218). The chancroidal ulcer appears within a few days after suspicious coitus. It is tender and sometimes quite painful, and is liable to be accompanied with painful inguinal adenitis, in which the glands become matted together and later suppurate.

There is no marked induration underlying the sore—it is a "soft sore." On account of the infective character of the secretion, other ulcers appear, and frequently the ulcers of the vulva are complicated by ulcers about the anus. It often happens that these lesions about the anus give rise to more troublesome symptoms than the vulvar ulcers and are really what causes the patient to seek relief.

Syphilitic ulcers are of two kinds, the primary lesion, called also "chancre" or "hard sore," and the deep tertiary ulcers. The characteristic primary sore of syphilis becomes apparent two to four weeks after suspicious coitus. It is small and not particularly painful, but presents an underlying area of induration which feels to the examining fingers as though a small piece of stiff paper were lying beneath the ulcer. The inguinal adenitis, which appears after a short time, is practically painless and there is no tendency to suppuration nor to matting together of the glands. However, the primary sore is seldom so distinctly characteristic that it is justifiable to begin constitutional treatment before secondary manifestations confirm the diagnosis. The superficial secondary lesions, which about the vulva appear as flat condylomata, are not really ulcers but simply erosions. The ulcers appearing in the later stages of syphilis are usually ragged, irregular, indolent and persistent, and there are other evidences of syphilis. In a doubtful case, a course of potassium iodide may assist in clearing up the diagnosis.

By a bacteriologic examination of a piece of tissue excised from the lesion, a positive diagnosis may be made at once, in the primary or secondary or tertiary stage of the disease (see under Syphilis, page 427).

In **tubercular ulcer** there may be other organs presenting tuberculosis. Also the nature of the ulcer is indicated by its appearance, by finding tubercle bacilli in the discharge or scrapings and, if still doubtful, by the examinations of sections of tissue from the margin of the sore.

In **malignant ulcer,** that is, an ulcer due to the breaking down of tissue infiltrated with carcinoma or sarcoma cells, there is a surrounding area of induration, representing that portion of the malignant infiltration which has not yet broken down. A malignant ulcer is chronic and bleeds easily, and the tendency to bleed is not checked, but rather increased, by the application of 10% copper sulphate solution. In the case of a chronic ulcer of doubtful character, a piece of the margin of the ulcer should be excised for microscopic examination. Carcinoma in this situation causes death in about two years. To remove the growth completely, the operation must be performed in a very early stage, hence the importance of an early diagnosis.

Treatment. The first efforts in the treatment of any ulcer of the external genitals should be directed toward securing cleanliness and allaying irritation, by the measures recommended under Acute Vulvitis. In simple ulcer, after cleansing with carbolic or bichloride solution and drying with absorbent cotton, the patient may apply an antiseptic ointment, such as carbolized vaseline (1%) or the chloretone ointment (see Formulæ). This cleansing, followed by the application of the ointment, may be carried out two or three times daily by the patient at home, or more frequently if there is much discharge. A very efficient cleansing application for the patient's use is hydrogen peroxide. Every second or third day apply some astringent, such as protargol (10%) or silver nitrate solution (10%) or copper sulphate solution (10%), to all portions of the surface of the ulcer, and after that an astringent antiseptic powder. The genitals should be kept covered with a piece of absorbent cotton held in place by a T-bandage. If there is an accompanying vaginal discharge, the patient should take an antiseptic douche one to three times daily. If these cleansing and antiseptic measures do not cause the ulcer to heal promptly, it is probably not a simple ulcer but belongs to one of the special varieties.

CHANCROID

OF VULVA AND VAGINA.

Chancroid is an infectious ulcer, entirely local in its effects and due to inoculation with secretion from another chancroid. It is known also as "soft chancre" and as "soft sore." It constitute sone of the three so-called "venereal diseases" (gonorrhoea, chancroid, syphilis).

It is due to a specific infectious agent which causes chancroid and nothing else. It is invariably due to contact with virus from another chancroid, and sexual intercourse is nearly always responsible for this contact.

The infectious principle of chancroid is much more exclusively conveyed by sexual intercourse than syphilis. Conversely, chancroidal virus is much less liable than syphilitic virus to be coveyed in an active state simply by contaminated articles. However, such method of conveyance is probably possible and must be guarded against. The chancroidal virus does not penetrate healthy epithelium but makes its entrance through a crack or abrasion.

The infectious agent is a short bacillus, discovered by Ducrey and hence designated as the **Ducrey bacillus.** It occurs in the discharge, but cannot be satisfactorily identified there because of contaminating material. For diagnostic examination a **tissue-specimen** should be secured.

In the case of enlarged glands, the **serum** secured by puncture with a large hollow needle is usually satisfactory for diagnostic examination.

Pathology.

Within twenty-four to forty-eight hours after infection, there appears a small pustule on an inflammatory base. This point of infection may be situated at any part of the external genitals or in the vagina. This beginning lesion may not be noticed by the patient, so that according to her statement the lesion may not have appeared for several days or a week after coitus. In a short time the epithelial covering over the infected spot is lost and a small ulcer is thus formed. This ulcer has sharp, punched-out margins, a rough and sometimes necrotic base, is surrounded by a red inflammation zone and is accompanied by more or less inflammatory edema. In cases of long standing or of much inflammation, there may be considerable round-cell infiltration and induration around the ulcer and under it, but there is rarely if ever the marked parchment-like or cartilage-like induration that develops under the primary lesion of syphilis.

Usually the ulcer gradually enlarges and deepens, the destruction as a rule being more rapid and extensive in the vagina than on the external surface. During this stage the base of the ulcer usually shows sloughing tissue or false membrane, and the surrounding inflammatory zone is marked. Alcoholic drinks, friction fron.

exercise and also uncleanliness, increase and prolong the destructive action. Ordinarily after several days, the time depending somewhat on the patient's habits and general health, the ulcer shows a tendency to heal. Under treatment, the base clears off and shows apparently healthy granulation tissue, the surrounding inflammatory zone grows less and the secretion becomes more like ordinary pus. Gradually the granulating surface is replaced by a thin layer of scar, which begins at the margin and progresses towards the center. The usual duration of a chancroid is two to three weeks. A relapse may occur at any stage of the healing process and even when apparently healed, the lesions are for some time infectious.

Such is the regular course of a chancroidal ulcer, but several other conditions may develop, as follows:

a. In chronic alcoholics and other subjects of diminished resistance, the ulcer may present ragged and undermined edges and becomes very destructive and rapid in its advancement, constituting what is known as a **phagedenic chancroid.**

b. Any surface which lies against a chancroid is liable to develop a secondary chancroid at the point of contact, after sufficient time for the irritating discharge from the primary chancroid to cause an erosion and thus open an avenue for infection. Again, if pus from a chancroid comes in contact with a scratch or abrasion in the vicinity, it causes another chancroid.

This is called **auto-inocculation** and it is one of the marked characteristics of chancroidal lesions in contra-distinction to the syphilitic chancre. It is also one of the strong proofs of the purely local character of chancroid. On account of this property, chancroids are usually multiple. There may be two or three or there may be many (Fig. 218). Frequently the secretion runs down over the anus, where it comes in contact with abrasions and causes chancroidal ulcers that are more painful than the vulvar lesions. Sometimes the infective secretion penetrates the hair follicles or sebaceous glands of the vulva, forming small round sores called follicular ulcers.

c. Not infrequently the virus is carried by the lymphatics to the inguinal glands and there causes **chancroidal bubo** which usually suppurates and gives rise to a discharge, which is as infective as that from the original ulcer. Of course, ordinary pus germs accompany chancroidal inflammation, and the ordinary pus germs may cause a simple bubo, not containing any chancroidal virus. Such a bubo would not of course be a chancroidal bubo, but would be a simple bubo accompanying a chancroidal ulcer. It is not settled just what proportion of buboes are of this class.

d. It sometimes happens that syphilitic infection takes place at the same time as the chancroidal infection or just before it or after it. This constitutes a **mixed infection** which not infrequently causes a mistake in diagnosis and much chagrin on the part of the physician, who sees unmistakable evidences of syphilis develop from a sore which he had pronounced simply a chancroid. For the first two or three weeks there may be nothing to indicate that syphilitic infection has taken place, but after that time the ulcer, instead of cicatrizing as a chancroid should do, develops the induration and other charatceristics of a syphlitic sore. This mixed infection occurs rather frequently and its possibility in any particular case must be kept in mind, that due caution may be exercised in giving the diagnosis and prognosis.

Symptoms.

There may be few or no symptoms, except when the ulcer is touched or rubbed by the clothing. In some cases the patient complains only of a discharge and smarting on urination. She may be unaware that any sore is present on the genitals. On the other hand, the patient may complain of much itching and of other symptoms of acute vulvitis due to the irritating discharge. If the ulcer is so situated that the urine flows over it, there is usually considerable smarting and pain on urination. When situated in the vagina, the ulcer gives rise to an irritating discharge, frequently blood-streaked, and also to other symptoms of vaginitis.

In multiple chancroids, the discomfort is accordingly increased, and in phagedenic chancroid the general health may be seriously impaired. In chancroids about the anus, there is much pain, particularly on defecation, and occasionally the excruciating pain of anal fissure appears.

If infection of the lymphatic glands takes place the patient complains of pain in the affected groin, increased by walking, and of a tender lump in the groin. The conditions found on examination of a chancroidal ulcer have been described under Pathology. In the case of mixed infection, symptoms of secondary syphilis develop after sufficient time has elapsed.

Diagnosis.

The diagnosis of chancroid is based on the following points:

1. Development within a few days or a week after suspicious coitus.
2. Location and mode of development and appearance of the lesion.
3. Two or more lesions, indicating auto-inoculation.
4. Absence of parchment-like, or cartilage-like, induration under the ulcer.
5. Presence of a painful bubo tending to suppuration.
6. In a doubtful case, a piece of tissue may be excised from the involved area, and submitted to a bacteriologic examination, to establish the presence or absence of the Ducrey bacillus.

A SIMPLE ULCER may be due to an abrasion in the first intercourse after marriage, or to infection of a denuded point with ordinary pus germs. A simple ulcer is not so exclusively associated with coitus, does not give rise to so much inflammatory reaction nor exhibit such an angry appearance, does not show such a tendency to spread and destroy tissue. If kept clean for a few days, it shows healthy granulations and healing edges, is more liable to be single (as auto-inoculation is not so frequent and marked) and involvement of the lymphatic glands with suppuration is rare.

In HERPES, the abrasion is preceded by a vesicular eruption and there are usually several lesions close together or joined. The lesion is very superficial, the red surafce being still covered with a thin layer of epithelium. The margin is small and regular and there is but little inflammatory reaction.

It must not be forgotten, however, that an herpetic lesion may afford entrance to ordinary pus germs or to chancroidal virus or to syphlitic infection, in which case characteristic signs will develop in due time. For the distinguishing characteristic of syphilitic lesions and tubercular ulcer and malignant ulcer, see the succeeding pages.

Treatment.

The treatment for chancroid is through cauterization, to destroy the chancroidal virus. The earlier this is done the fewer ulcers there will be and the less chance of suppurating bubo.

Carbolic acid (95%) is, I think, the preferable cauterant in the cases where the ulcer is comparatively superficial and no general anesthetic is necessary.

The ulcer is cleansed and then covered with a pledget of cotton soaked in 20% cocaine solution, which is left in place five minutes. Then remove the cotton and cleanse the surface of the ulcer again. Then cauterize every portion of the ulcer with the carbolic acid. For applying this, a tooth-pick with a few shreds of cotton wound firmly on the end of it, is very convenient, or a cotton-wrapped applicator may be used. If any of the carbolic acid should touch the skin, an immediate application of alcohol will stop destructive action

Rub the carbolic acid into every crevice and irregularity of the ulcer, removing any soft granulations and working the cauterant into the depth of the affected area. When the surface has been thoroughly cauterized then apply alcohol to stop further action. Then cleanse the ulcer and apply some soothing ointment. Vaseline or carbolized vaseline does very well.

The patient should keep rather quiet (lie down most of the time if she can) for a few days. She should cleanse the parts frequently with the carbolic wash or other antiseptic wash and dry with cotton and apply the vaseline or other ointment. There is some reaction, but that subsides after a few days, and the ulcer begins to show healthy granulations and rapid healing. After that the treatment is the same as for a simple ulcer.

In cauterizing the ulcer it is important that every particle of the infected surface should be thoroughly cauterized, for if active virus is left at any point, it will reinfect the enlarged ulcer left after the sloughs from cauterization separate.

The advantage of carbolic acid over nitric acid or the thermo-cautery is that it is less painful. It has an anesthetic effect that lasts for some time after the cocaine anesthesia has disappeared. If the ulcer becomes very painful from the reaction following cauterization, hot applications may give much relief. These are made by wringing a large piece of absorbent cotton out of hot water or hot antiseptic solution. The moist cotton, while still steaming, is applied to the genitals and covered with a piece of oiled-silk. These hot applications may be used frequently if required to relieve pain. If the sore is in the vagina, hot antiseptic douches should be used.

At the office treatments, later, the ulcer is cleansed with hydrogen peroxide, dried with absorbent cotton and then dusted freely with some antiseptic powder. Iodoform is efficient, but its odor prevents its use. There are a number of good powders without the odor. Among the best are xeroform and aristol.

The ulcer should be protected from irritation from the clothing by a pad of absorbent cotton over the genitals. The office treatment is repeated every secon or third day until the ulcer is healed. For home treatment, the patient may was the genitals three or four times daily with a weak carbolic solution or some other mild antiseptic.

If pain or restlessness is marked, a sedative may be given as required to produce rest. If the patient's general health is poor, she should of course be given tonics. The diet should be liberal and nourishing. Alcoholics are to be avoided in most cases. Constipation must be overcome.

There is no specific internal treatment for chancroid. The following remedies have been thought by different observers to help in controlling the ulceration, and it is well to use one of them in severe cases:

Calcium Sulphide, 1-12 to 1-8 gr. every four hours.

Hydrag-bichloride, 1-50 to 1-30 gr. three times daily.

Potassio-tartrate of Iron, 3 to 5 gr.three times daily.

In **phagedenic chancroid** cauterization is the most effective treatment. The cauterization must be thorough, extending into every irregularity of every chancroidal lesion present, for if active virus is left at any point it will reinfect the enlarged ulcers left after the sloughs separate. If the chancroidal ulceration is extensive or if there are sinuses or if there are severe anal lesions, it is best to give the patient a general anesthetic, that sinuses may be laid open freely and all lesions carefully cauterized. After cauterization, there is left a simple ulcer which usually heals rapidly under the ordinary cleansing and antiseptic treatment previously given. If the granulations become sluggish, they may be stimulated by the application of silver nitrate solution (5% to 10%) or copper sulphate solution (10% to 25%). The copper sulphate is especially indicated where there is any hemorrhagic tendency. If the granulations are persistently unhealthy, they may be cleared away with the sharp curet and the surface then stimulated to healthy action, as above indicated.

The **treatment of chancroidal adenitis,** and of suppurative buboes in general, has been the subject of much thought and experimentation.

Of first importance is prophylaxis. The most certain means of preventing a bubo is to secure rapid healing of the genital sore. This is one of the strong points in favor of cauterization of chancroids, for thorough cauterization, probably more than any other one measure, checks the infective process and causes rapid healing.

When soreness in the groin with some enlargement of the glands is noticed, the patient should be put to bed and kept there, and COMPRESSES wet in the lead and alum lotion (see Formulæ) should be applied to the affected region. A piece of absorbent cotton is moistened with this solution and then applied over the affected glands and held in place by a bandage so arranged as to make rather firm pressure on the glands. A "spica" bandage is the form usually used. The dressing should be renewed two or three times in the twenty-four hours, depending on the intensity of the inflammation. Spitschka, who originated this treatment, regards it as by far the most effective abortive treatment in the first stage of adenitis, much more so than applications of tincture of iodine or poultices or the ice-bag. Under this treatment the pain usually subsides rapidly, and frequently suppuration is prevented. If dermatitis results, the solution may be weakened or discontinued, a soothing ointment being then applied.

INUNCTION of half a teaspoonful of mercurial ointment over the tender glands once daily for a few days is another measure which seems to prevent suppuration, but mercurialization must be guarded against. Another method much used, is the application of the mercury, belladona and iodine ointment (see Formulæ). The ointment is rubbed in over the swollen glands, then cotton is applied, and over all a firm spica bandage. The bandage should be applied firmly enough to make considerable pressure on the glands. The dressing may be changed once or twice daily.

If after a few days trial of one of the above measures, the adenitis is still increasing, the time for INTRA-GLANDULAR INJECTION has arrived. Many solutions for injection have been tried with benefit. Probably the best injection-solution is the 1% solution of benzoate of mercury, recommended by Welander. With an ordinary hypodermic syringe, five to ten drops of this solution is injected into each of the enlarged glands, the skin having, of course, been thoroughly disinfected. The needle may be entered at several points, if necessary to reach the various glands. The total amount of solution injected should not exceed twenty or thirty drops.

The injection causes considerable reaction, as evidenced by pain and swelling and some fever. After two or three days, the irritation subsides and usually resolution takes place, if the buboes were not fluctuating at the time of injection. If one injection is not sufficient, another may be made after several days, even though fluctuation is present.

If the evidence of fluid persists several days after all irritation from the injection has subsided, the abscess should be opened by INCISION and the incision kept open by a strip of antiseptic gauze, and the cavity treated in the ordinary way with peroxide and bichloride solution.

Some cases presenting fluctuation have been cured by injection. Even when incision later is necessary the injection seems to be beneficial in three ways:

a. The glands opened after injection rarely show chancroidal ulceration, but heal as simple abscesses.

b. Complete liquifaction of all involved tissues is more frequent, so that deep curetting or extirpation of partially broken-down glands is rarely necessary.

c. Other glands are seldom involved after the injection of those first affected, consequently many glands are saved and an extensive scar avoided.

The most certain and rapid method of curing a chancroidal bubo in an early stage is to COMPLETELY EXCISE the affected glands and close the wound immediately by sutures. However, only a small proportion of patients will submit to this radical treatment, particularly in view of the fact that many buboes recover without suppuration. Then there is the danger of the general anesthetic, slight to be sure, but ever present.

After the bubo has resisted abortive measures several days, suppuration is very probable and complete extirpation may then be urged with more force. Most patients, however, prefer the less radical injection method and some object even to that, insisting on simple external applications to relieve the pain and incision later when absolutely necessary.

A **chancroidal sinus,** persisting from a bubo, may be injected with iodoform in glycerine (10%) once daily, after washing out with peroxide. If this does not cause the sinus to heal it may be curetted with a small curet under cocaine anesthesia.

If it still persists there are probably broken down glands that must be completely extirpated under a general anesthetic, before healing can take place.

SYPHILIS

OF VULVA AND VAGINA.

Syphilis is a general infectious disease, characterized by an initial sore (the point of entrance of the infecting germ) and by general secondary manifestations after several weeks and by tertiary lesions, localized in various parts of the body, after several years.

The infectious agent is the **spirochaete pallida,** a very small microbe which is found in all lesions (primary, secondary and tertiary). The demonstration of this germ, makes possible a positive diagnosis of syphilis at once, even in the primary stage and long before the clinical evidences appear. The positive identification of this infectious germ requires considerable bacteriologic experience, hence the specimens should be sent to a pathologist.

The following directions for preparing specimens, are those given by Dr. Carl Fisch, of this city, who has done much work with the spirochaete pallida.

In the case of a suspected PRIMARY LESION (chancre), wipe the surface of the ulcer clean, with cotton or gauze, and then scarify the surface with a needle. From the "irritation serum" which results, make a **spread-preparation** on a slide or cover-glass, just as in making a preparation of blood. Half a dozen specimens are made and dried and then packed for transmission.

In SECONDARY LESIONS (mucous patches, moist papules, dry papules), a spread-preparation of the "irritation serum", made as above directed, will usually suffice for a diagnosis. A negative finding, however, does not certainly exclude syphilis. Consequently, to make the diagnosis certain, a **tissue-specimen** should be examined. This is easily secured by clipping off a small papule. Preserve all tissue-specimens to be examined for the spirochaete pallida, in 10% formol solution. Specimens preserved in alcohol do not do so well.

In TERTIARY LESIONS only **tissue-specimens** can be used for diagnosis, and they must be taken from the capsule, or tissue about the gumma. The gummatous material, or necrotic material in the center of a "gumma", is not suitable for such diagnostic examination.

Syphilis may be hereditary or acquired. In the hereditary form the lesions of the genitals either constitute only a small part of the general syphilitic picture, as in the severe cases leading to death of the infant, or appear as ordinary tertiary lesions later in life. Consequently hereditary syphilis requires no special consideration in this connection. Acquired siphilis is due to inoculation of a crack, scratch or abrasion with secretion from a syphilitic sore or with syphilitic blood.

In the case of a primary sore of the vulva or vagina, there has, of course, been contact of the genitals with the syphilitic virus, either by sexual intercourse, which is the more common way, or by contact with contaminated clothing or fingers or household utensils or bath-room articles (particularly the water-closet seat in public places). In the case of tertiary or secondary lesions of the genitals, the primary lesion may have been on the genitals or on any other part of the body.

Pathology, Symptoms, Diagnosis.

Syphilis of the vulva or vagina may appear in the form of primary or secondary or tertiary lesions.

Primary lesions. For a period of two to three weeks after infection with syphilitic virus, there is nothing to indicate that such infection has taken place. The small abrasion, through which the infection took place, heals in a few days as though nothing had happened and there is apparently no morbid process going on there. This is known as the "first incubation period." In exceptional cases it may be less than two weeks or more than three weeks, sometimes extending to six or even eight weeks.

At the end of the incubation period a papule appears at the point of infection. If the virus entered at two or three points, there may be a like number of lesions, but this is exceptional. The small red papule is the usual form which the initial lesion takes. The papule may be decidedly elevated and pointed, or it may be flat and scarcely raised above the surface, but in either case some induration, slight at first, may be felt.

If this papule is situated on the external surface and is kept dry, it remains simply as a dry papule with some scaling but no ulceration. This form of primary lesion is known as the **dry scaling papule.** It enlarges peripherally and may vary in size from a pea to a dime. Exceptionally, the flat papule may grow to the size of a silver quarter.

The **induration** also increases, and at the end of a week or ten days is characteristic. The best way to feel this induration is to grasp the lesion between the thumb and finger and gently squeeze it or, more accurately, squeeze the tissues beneath it. The induration assumes two forms. It may be present as a thin dense layer under the papule or ulcer. When grasped as just indicated, such form of induration gives the sensation of a small piece of thick writing-paper or stiff blotting-paper lying horizontally under the lesion. The margins are quite distinct and, when pressed, the plate of induration can be felt to bend much as a piece of blotting paper would. This is called "parchment induration." On the other hand, the induration may be present as a thick rounded mass, occupying the base of the papule or ulcer and extending a considerable distance below it. This area of induration is in the form of a nodule which is dense and firm and presents distinct outlines. When examined by grasping, as before described, it gives the impression of a piece of cartilage beneath the sore and is known as "cartilaginous induration," called also "nodular induration."

The induration of a syphilitic chancre disappears very slowly. When well marked it persists through the second incubation period, i. e., until the development of secondary symptoms, and then gradually undergoes involution. As a rule, the primary lesion with its accompanying induration, disappears completely within six to eight weeks after the beginning of the secondaries. Frequently some induration or a pigmented spot marks the cite for several months longer, and occasionally the indurated tissue becomes somewhat organized and persists indefinitely as a small hard nodule of scar tissue.

Another form of primary lesion is the **superficial erosion.** This is noticed as a small round or oval red spot which may or may not be slightly raised. The center is often slightly depressed. The top layers of epithelium over this spot have been thrown off, forming a superficial abrasion, or raw place, called an erosion. A thin gray film usually occupies the center of the lesion and in many cases covers all of it. The characteristic induration is present.

A third form of initial lesion is the **indurated ulcer.** If either the dry papule or the superficial erosion lose all their epithelium, so that granulation tissue forms, there is an ulcer with an indurated base. This transformation is especially liable to take place when the lesion is kept moist, hence it is most frequently met with in the vagina or on the inner surfaces of the labia. It may, however, occur in any situation, and in many cases the ulcer is apparently present almost from the beginning. This indurated ulcer was the first form of primary lesion recognized as indicating infection from syphilis, and to it were given the names "hard chancre" and "hard sore" and "Hunterian chancre."

Any of the three forms of primary lesion may be small or large. Unless accompanied with pus infection, they give rise to very little pain or disturbance, and if small may be overlooked entirely by the patient. Many women presenting unmistakable evidences of syphilis can give no history of a primary sore because it escaped their notice. This is especially liable to occur if the lesion is situated in the vagina. Furthermore, a small primary lesion in the vagina may, after a short time, disappear so completely that even the physician can find no trace of it.

There is a fourth form of primary lesion, and that is the **mixed sore.** By a "mixed sore" is meant a sore with a double infection—both chancroidal and syphilitic, the former disease being manifest first, and the latter, two to four weeks later. At first the sore is apparently an ordinary chancroid, but after two or three weeks the sore loses its chancroidal characteristics, induration appears under it and an ordinary hard chancre develops, to be followed by other evidences of syphilis. In other cases, the chancroidal ulceration heals during the incubation of the syphilitic germ, but at the end of that period the scar becomes indurated, perhaps ulcerated, and a primary syphilitic lesion appears.

A primary syphilitic ulcer does not present the angry appearance and destructive characteristics of the chancroidal sore. It is apparently a much less virulent affair. The edges are not undermined but slope inward, there is not such a marked zone of inflammatory reaction and the ulcer does not spread so rapidly nor so persistently. It is more indolent and frequently is nearly painless. In fact, the absence of pain, such as would ordinarily be expected from the size and location of the sore, is one of the striking characteristics of syphilis. But any syphilitic lesion may become infected with ordinary pus germs, in which case it usually becomes painful. The primary sore may heal within a week or two after its appearance, or it may persist all through the second period of incubation.

The primary syphilitic lesion of the external genitals is accompanied by enlargement and induration of the inguinal glands on the same side as the lesion. This enlargement may be marked or it may be slight, but it is always present. It begins in a week after the appearance of the primary lesion. It is due to an indolent inflammation or induration of the glands. Several glands are affected and they may be felt as distinct painless nodules, entirely separate and freely movable. Unless there is a mixed infection, with chancroidal virus or with ordinary pus germs, the glands do not present any evidence of acute inflammation and there is no suppuration.

Secondary Lesions. On the vulva, secondary syphilis usually manifests itself by the development of moist papules, called also "condylomata lata" (Figs. 261, 262). These may appear any time during the first twelve months of the secondary period. The syphilitic condyloma consists of a slightly elevated, flattened area from which part of the epithelial covering has been thrown off. It may be any size from the head of a pin to as large as the thumb-nail. There are usually several lesions and in some cases dozens of them. The individual lesions have a fairly regular circular or elliptical outline. Several of them may coalesce, forming large irregular infiltrated patches (Fig. 261). In some cases there is a slight secretion, and all of them are kept moist a portion of the time by the secretion from the vagina. They are not painful and cause very little disturbance, except when irritated. When the vaginal discharge is very irritating, some of the lesions may becomes in flamed, in which case they are reddened and angry-looking and painful. When inflamed, the thin epithelium may be lost, giving rise to an ulcer which may involve a part or all of the lesions. Sometimes abrasions on the lesions are caused by scratching.

The favorite locations for the moist papules or flat condylomata, are the labia minora and the inner surfaces of the labia majora. In some cases, however, they cover all the external genitals and extend even on the adjacent surfaces of the thighs (Fig. 262).

Associated with them are other evidences of secondary syphilis, such as a general eruption, enlargement of the inguinal and epitrochlear and post-cervical glands, persistent sore throat, sores in the mouth and loosening of the hair.

Tertiary Lesions. Tertiary syphilis of the vulva and vagina usually presents itself in the form of persistent and destructive ulceration. When occurring in the vicinity of the vestibule, it not infrequently leads to destruction of the urethra. Its victims are usually in a state of poor health and lowered vitality. They have little tissue resistance, hence the destructive action of the ulcer. Coincident ulceration of the rectum, with stricture formation, is frequent. When syphilitic ulceration affects the upper part of the vagina or the cervix uteri it may be mistaken for cancer.

A tertiary syphilitic ulcer is usually indolent, comparatively painless and persistent in spite of local treatment. There are usually other evidences of tertiary syphilis or a history of previous secondary or tertiary symptoms. The ulceration heals under anti-syphilitic treatment, provided the patient's vitality is not so lowered that the normal tissue resistance is destroyed.

The diagnosis of tertiary syphilitic ulcer is made principally by the presence of other evidences of syphilis, by the exclusion of other forms of chronic ulceration (chancroid, tuberculosis, cancer), by the effect of treatment and by the Wassermann reaction. In the case of persistent ulcer, of doubtful character, a piece of the margin of the ulcer should be excised for microscopic examination.

Treatment.

A patient should not be given constitutional treatment for syphilis until the diagnosis is positive. As a rule a positive diagnosis before the appearance of the "secondaries" is not possible by the ordinary clinical evidences. By bacteriologic examination, however, a positive diagnosis may be made at once, even in the very earliest stage of the primary lesion.

When the diagnosis is thus made early, it is recommended by some authorities that the primary lesion be at once completely excised — not with the idea of preventing general syphilis, but to modify it and lessen the effect of the succeeding stages. This excision treatment of the primary lesion is still experimental.

Otherwise the only treatment that the primary lesion requires is local cleansing and antiseptic measures, such as are recommended under Simple Ulcer. The secondary and tertiary lesions require regular constitutional treatment for syphilis, i. e., mercury in the secondary stage, iodides and tonics in the tertiary stage and a combination of the two in the intermediate stage (late secondary and early tertiary). For the details of the internal treatment of syphilis the reader is referred to works treating of that subject.

The local treatment for the secondary and tertiary lesions of the vulva and vagina, is simply cleansing and antiseptic and astringent, i. e., the same as for Simple Ulcers. Argyrol (25%), protargol (10%), silver nitrate (2% to 10%) are excellent applications for mucous patches. Bichloride solution (1-2000) is a good wash for the same. Calomel as a dusting powder is also useful in relieving the irritation. These applications are likewise beneficial in tertiary ulcers. For cleansing all the irregularities of a deep ulcer, hydrogen peroxide is effective. When there is a tendency to bleed, copper sulphate solution (10%) may be used.

Ravogli highly recommends emplastrum hydrargyri as an application in tertiary syphilitic ulcerations. Wash the ulcer with bichloride solution (1-2000) and then apply the emplastrum hydrargyri. This causes temporary increase in the discharge due to the breaking down and discharge of the unhealthy granulations and detritus at the bottom of the ulcer. After a few applications healthy granulations appear and healing begins. After that the ulcer is given ordinary antiseptic treatment, i. e., it is washed with bichloride solution or hydrogen peroxide, or both, and then dusted with an antiseptic powder.

TUBERCULOSIS OF VULVA.

Tuberculosis of the vulva is the term applied to those lesions of the external genitals produced by tubercle bacilli. Tuberculosis of this region and other forms of persistent vulvar ulceration were formerly described together under the terms "lupus vulvae," "lupus hypertropicus," "lupus perforans," "ulcus rodens," "destructive ulcer of vulva" and "perforating ulcer of vulva." As the pathology of the various forms of ulceration was gradually worked out, it was found that in many of the cases of destructive ulceration, tubercle bacilli were present. The tubercular lesions were then formed into a class by themselves and this class includes a large number of the cases of persistent ulceration formerly described under the titles above mentioned.

Tuberculosis of the vulva is due to local infection with the tubercle bacillus. The infection may take place through an abrasion, in which case the infecting germ may be brought to the abrasion by a tubercular discharge from the uterus or vagina, or possibly by coitus with a husband having a tubercular lesion of the genito-urinary tract or by fingers or clothing infected with tubercular discharge either from the patient or from some other person.

On the other hand, tissues may, in rare cases, be infected without any break in the epithelial covering. In such a case the tubercle bacilli may come by way of the blood or lymph.

Tuberculosis of the vulva begins as a small nodule, usually situated near the meatus or the clitoris or at the posterior commissure. It may be of a dusky red or bluish color. Microscopic examination of such a nodule shows the usual round-cell infiltration, the necrotic areas, the giant cells and the tubercle bacilli, found in tubercular lesions elsewhere. There may be only a single nodule or there may be many. After a time the nodules break down and form small ulcers. The ulcers have hard margins and an irregular base and are very liable to have an area of irregular infiltration about them. The ulcers discharge some, and this discharge may or may not show tubercle bacilli. As the ulcers enlarge they coalesce, forming extensive areas of ulceration of very irregular outline (Fig. 219). As the ulcer extends at one part it may heal at another, giving rise to much scar tissue. By gradual contraction the scar tissue interferes with the local circulation of the blood and lymph and may lead to marked stasis hypertrophy and induration of the labia and clitoris.

Tubercular ulcers are chronic and persistent and may extend deeper and deeper until fistulous openings are formed into the rectum or bladder or urethra, hence the name perforating ulcer. Even when adjacent cavities are not opened, the ulcers, in conjunction with the contracting scar tissue, may form sinuses and discharging surfaces extending deeply in various directions, and sometimes causing perforations through the labia.

A positive diagnosis requires a microscopic examination. In a doubtful case the crucial test of the character of the ulceration consists in finding tubercle bacilli in the secretion or in demonstrating the characteristic pathological changes in a specimen of tissue removed from the margin of the ulcer.

Treatment. If there are no marked tubercular lesions elsewhere, the whole infiltrated area should be excised and the wound closed by sutures. If the infiltration can not be excised, the ulcer should be thoroughly curetted and then deeply cauterized with carbolic acid or the thermo-cautery. If the patient does not wish these severe measures, the surfaces may be touched frequently with tincture of iodine or with lactic acid and then powdered with iodoform. In some cases the use of these substances causes healing. At the same time the patient should receive constitutional treatment for tuberculosis. If any new areas of the tubercular process crop out they should be given the treatment found effective with the first lesion. When the disease is still in the stage represented by small nodules, the following treatment is recommended by Unna. A number of the nodules are punctured with an acne-lance. Then a small shred of absorbent cotton is moistened in a mixture of mercury (one part), carbolic acid (four parts) and alcohol (twenty parts), and pushed into the lance opening with a sharp-pointed instrument and turned about and left there ten or fifteen minutes. In three to five days the irritation has subsided and other nodules may be treated in the same way, and thus the process is continued until all traces of the tubercular infiltration has disappeared.

For tuberculosis of the vulva and for rodent ulcer, there is a treatment which promises to be superior to any other yet devised, not excepting the knife. I refer to treatment by the X-Ray and by the Finsen light. In superficial tuberculosis, a cure is almost certain and with comparatively little disturbance of healthy tissue. In both of these affections this treatment is as a rule preferable to the knife. The treatment is long but it gives better results, i. e., there is as large a percentage of cures, with less disfigurement and with practically no pain.

TUBERCULOSIS OF VAGINA.

Tuberculosis of the vagina is usually secondary to tuberculosis of the uterus and tubes, the vaginal surface being infected from the tubercular discharge from above. Some cases occur, however, in which there is no tubercular trouble higher in the genital tract. In such a case the vaginal tuberculosis may be due to sexual intercourse with a husband having tubercular lesion of the genital tract, or to the use of an infected douche-nozzle or to the extension inward from tuberculosis of the vulva.

The most common site for vaginal tuberculosis is the posterior vaginal fornix, which region comes most in contact with the uterine discharges. It is supposed that the resistance of the vaginal epithelium must be lowered by an irritating discharge or otherwise, before invasion by the tubercle bacillus can take place. The first manifestation of tuberculosis of the vaginal wall is the development of a number of miliary tubercles. These may be confined to a small area, for example, to the posterior fornix, or may appear over a large part of the surface at once.

Each miliary tubercle is a small, raised, grayish or yellowish dot, the size of a millet seed or smaller. As the lesions develop they break down and form small ulcers, which may coalesce and form ulcers of various sizes. The tubercular ulcer has a punched out appearance, the edges being perpendicular, and the base is yellowish gray and may show many miliary tubercles. The miliary tubercles frequently occur in large numbers in the hyperemic zone about the ulcer.

Symptoms and Diagnosis. The stage of ulceration is usually the time at which the patient consults the physician, complaining of discharge and discomfort. Examination reveals the suspicious ulcer or ulcers and further investigation will usually show tubercular disease of the uterus or tubes.

The discharge from a tubercular ulcer contains tubercle bacilli, but sometimes in such small numbers that they are not found when the discharge is stained and examined. In a doubtful case, some tissue from the margin of the suspected ulcer may be sent to a pathologist for examination. In such a specimen, in addition to the tubercle bacilli, there are found the characteristic giant cells and necrotic areas. Another way of testing for tuberculosis in the laboratory, is by injecting some of the secretion into the peritoneal cavity of a guinea pig, where it causes tubercular peritonitis with characteristic lesions.

Treatment. The treatment is the same as that described under tuberculosis of vulva.

MALIGNANT DISEASE OF THE VULVA.

Carcinoma and sarcoma may affect the external genitals, In this situation they are distinguished by the same signs that characterize them elsewhere, namely, progressive induration, ulceration and involvement of the neighboring lymph glands. Malignant disease of the external genitals is rather rare.

Epithelioma is the most frequent form. This begins usually on the lower portion of the labium majus as a small hard nodule with a bluish tinge especially about the edge. The nodule grows slowly and at first may produce no symptoms. In some cases, however, even from the first there is severe pruritis. After a time, part of the nodule breaks down, forming a small ulcer which is surrounded by an area of induration. There is a watery discharge sometimes mixed with blood. When occurring about the meatus it sometimes causes the urethra to appear as a firm indurated cylinder. The progress of the disease is now more rapid, the extension being usually in the long axis of the labium. Later, the adjacent surfaces and structures become involved. A fungus or protruding growth may appear. Figs. 220, 221, 222, 270, 271 and 272, show various cases of epithelioma of vulva.

The inguinal glands become enlarged early, at first simply from the lymphatic enlargement that always takes place when there is inflammation or persistent irritation of the genital region. Later the glands become infiltrated with cancer cells and often greatly enlarged. In the latter stage the carcinomatous glands break down and ulcerate externally.

Experience has shown that, unless recognized and extirpated very early, the disease is usually incurable. Its duration from the beginning is usually about two years.

The patient may suffer from burning and superficial pain in the early stages and later there may be severe pain from involvement of the deeper structures. Carcinoma of the clitoris (Fig. 222) has been observed a number of times. Frequently it is melanotic. A more rare location for cancer is the vulvo-vaginal gland, the particular form of growth originating here being the adeno-carcinoma (Fig. 273). In all of these forms of growth, extirpation in a very early stage gives the only probability of cure. Consequently, in the case of a suspicious ulcer or nodule in which the diagnosis remains doubtful after careful treatment for a short time, a piece of the margin of the area should be excised for microscopic examination.

Treatment. Early and wide excising is the treatment to employ when the disease is operable. No time should be wasted with X-ray or other uncertain methods. After extirpation, X-ray treatment may be used to prevent recurrence.

If the malignant infiltration has gone too far for complete removal, palliative measures must be employed. These consist of general sedatives and local applications to relieve pain, curetment and cauterization of the ulcer, X-ray treatment and the employment of the various measures mentioned under simple ulcer. In advanced cases there is so much destruction of tissue by ulceration that it is difficult to keep the ulcerating surface clean and free from odor. Iodoform and charcoal, half and half, sprinkled freely over the surface and covered with gauze, aids in this. The salicylic acid and iodoform powder (see Formulæ) has much the same effect.

In the inoperable cases, opium will be required sooner or later to diminish suffering, and, when needed, it should be given freely and gradually increased as required to give relief. In the inoperable cases, particularly the cases of sarcoma, the mixed toxins of the streptococcus and bacillus prodigiosis (Coley's toxins) may be found beneficial. If these fail, the growth may be somewhat retarded by repeated injection of a few drops of alcohol in various parts of the growth. These injections may be repeated every two or three days or at longer intervals, according to the disturbance they cause.

MALIGNANT DISEASE OF THE VAGINA.

Carcinoma of the vagina is usually secondary to carcinoma of the uterus or rectum or bladder or external genitals, and the treatment depends on the situation and extent of the principal lesion. Primary carcinoma of the vagina is rare. It is of the squamous-cell variety (epithelioma) and, according to Pozzi, it occurs in two forms.

1. As a papillary growth. This form usually attacks the posterior wall of the vagina, making its appearance as a broad-based excresence, which first invades the fornix and then extends downward toward the vulva. It appears, in some cases, to have its origin in the neighborhood of plaques of chronic vaginitis.

2. Nodular or infiltrated form. This appears as nodules, which rapidly become confluent. The growth is sometimes localized about the wall of the urethra, giving rise to a well-defined clinical type known as "periurethral cancer." Ulceration here advances rapidly.

In primary cancer of the vagina, as in cancer elsewhere, a positive diagnosis in the early stage must rest upon the microscopic findings in an excised piece. The treatment is complete extirpation, if seen early enough. The results thus far have been unsatisfactory. There is usually recurrence. However, it is probable that the adoption of recent radical operations looking to the extirpation, not only of the infiltrated area but of all surrounding tissues likely to be involved, will give much better results, at least in the early cases. Also by special apparatus X-ray treatment and Actinic-ray treatment may aid some in preventing recurrence.

CHORIO-EPITHELIOMA. This variety of carcinoma sometimes occurs in the vagina. This curious form of tumor will be considered in greater detail under Malignant Disease of the Uterus. It arises from chorionic villi and may develop after normal parturition or after abortion or after mole-pregnancy. It usually develops in the uterus, but occasionally one of the chorionic villi transported to the vagina (pieces of chorionic villi are normally transported to various parts of the body in probably all pregnancies) takes on the peculiar change and forms a malignant growth. As it grows, it breaks into the veins, causing miniature hematomata in the vicinity. As this kind of tumor usually causes metastases through the body, with rapid death, it is important to recognize and remove it at the earliest possible moment. Such a growth in the vagina or in the vulva is usually metastatic from a similar growth in the uterus, hence the condition of the uterus should be investigated.

Sarcoma. One form in which sarcoma of the vagina occurs, is as a diffuse infiltration and degeneration of the lining membrane. This is the form sometimes found in young children. It occurs most frequently in the posterior vaginal wall. It begins as a small indurated area which slowly increases in size. After a time the epithelium covering the area is lost and an ulcer forms. The ulcer bleeds easily and is surrounded by an area of induration. A large part of, or even the entire circumference of the vagina may become involved in the sarcomatous infiltration, which may be mistaken for carcinoma or tuberculosis.

The symptoms of sarcoma of the vagina are leucorrhoea, hemorrhage, pain and obstruction of the vagina by the infiltration. Slight hemorrhage may appear in the early stages, particularly after coitus or exertion. In the late stages, profuse hemorrhages occur and there is also a muco-purulent or watery discharge that may cause much pruritis. The pain is slight at first but gradually increases in severity. It is usually worse at night. Examination reveals a nodular tumor or an area of induration or ulceration and more or less narrowing or obstruction of the vagina For a positive diagnosis of the nature of the growth a microscopic examination of a section of tissue is necessary. The treatment is the same as for carcinoma.

ULCUS RODENS VULVAE.

From the large group of affections formerly classified roughly under the terms "rodent ulcer," "lupus," "esthiomene," "perforating ulcer" and similar names, there have been cut out distinct classes, until now these cases are pretty well divided up as syphilis, tuberculosis (to which the term lupus is now restricted) and malignant disease, with special characteristics for each. There still remain, however, certain persistent destructive ulcers whose etiology is not definitely known, and consequently whose etiological classification can not yet be positively made. They are not syphilitic nor tubercular nor malignant.

They constitute a class by themselves and, in the absence of more definite information, are very appropriately designated by the non-committal term "ulcus rodens"* (gnawing ulcer).

Rodent ulcer of the vulva may be defined as a destructive chronic ulcer that is not syphylitic nor tubercular nor malignant.

The affection occurs almost exclusively in prostitutes and is apparently due to the combination of depressed general health and the chronic irritation of frequent coitus (traumatism) and varied and repeated infections and uncleanliness. The post-syphilitic state is undoubtedly an important etiological factor in many cases, the effect being due probably to the deteriorated general health and lowered tissue resistance. Real syphilitic lesions, i. e. those yielding to antisyphilitic treatment, are excluded by the terms of the definition of rodent ulcer, the clinical differentiation being aided by the therapeutic test. The cicatricial tissue which forms around and under the ulcerated area tends further to interfere locally with nutrition.

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* This must not be confounded with the "ulcus rodens" of the face, which is a definite and peculiar variety of epithelial cancer.

The pathological changes are those found in chronic ulceration with cicatrical change, but without any of the special characteristics found in syphilitic, tubercular or malignant ulcers. There is the granulating surface, the round-cell infiltration and the connective tissue hyperplasia. The ulceration often extends deeply into the structures in various directions and causes perforations and fistulae. As it spreads at one part it heals at another, thus forming scar-tissue. The contraction of this scar-tissue and of the inflammatory infiltration under the ulcer causes more or less interference with the lymph circulation. If the trouble persists for years, as it sometimes does, there is very likely to be stasis hypertrophy.

Symptoms and Diagnosis. The patient complains usually of leucorrhoea and of burning on urination and of pain on coitus. There are frequently evidences of irritation of the bladder or of the rectum. If the ulcer has penetrated deeply enough there may be incontinence of urine or feces. In some cases there is pain on walking or sitting, while in other cases, even with extensive ulceration, the patient has but little pain. In many cases the ulceration is accompanied with stasis hypertrophy, and in such cases there is nearly always considerable skin irritation. This is increased by uncleanliness and by the decomposition of the discharge in the folds and depressions of the hypertrophied structures.

Examination shows the ulceration, with or without stasis hypertrophy. A common site for the ulceration is about the vestibule and extending up into the vagina In some cases it extends deeply into the urethra, separating the lower urethral wall so that it is simply a flap, which falls away from the upper wall. This destructive ulceration may extend to the neck of the bladder and cause incontinence of urine. If the ulceration appears at the posterior part of the vulva it may penetrate into the rectum and cause a recto-vaginal fistula.

In the examination, it is important to separate the swollen structures and trace the ulcer in all its ramifications. Sometimes there are two or more ulcerated areas, and also spots of dermatitis due to the irritation of the discharge. If the manipulations cause too much pain to permit of a thorough examination, apply some 20% cocaine solution to the painful areas. Rodent ulcers usually bleed but little from the ordinary manipulations—not nearly so frequently nor so freely as malignant ulcerations.

From rodent ulcer we must distinguish the simple, chancroidal, syphilitic, tubercular and malignant ulcers.

In simple ulceration, there is usually some cause apparent, and the ulcer heals promptly on removal of the cause and the maintenance of cleanliness and the use of some mild antiseptic or astringent.

In chancroid, the ulcer is acute and presents the characteristics previously described for chancroid, and there may be a history of suspicious coitus followed in a few days by the painful ulcer which rapidly enlarges. Cauterization and the other treatment recommended for chancroid leads to prompt healing.

Tertiary syphilis often leads to destructive ulceration which very much resembles rodent ulcer. But there are usually other evidences of active syphilis, and the lesion is much benefitted by antisyphilitic treatment.

Tuberculosis of the vulva, in some cases, causes deep and persistent ulceration which is much like rodent ulcer. But the special characteristics given under tubercular ulcer are present, also microscopic examination of excised tissue or of pus and scrapings from the ulcer will show the trouble to be tubercular.

Malignant disease is characterized by the tendency to bleed on slight manipulation and by an area of induration about the ulcer. In a doubtful case a piece of the margin of the ulcer should be excised under cocaine for microscopical examination.

Treatment. The measures recommended under simple ulcers should be carried out and should be supplemented by general tonic treatment to build up the tissue resistance. In addition to this, practically every case of this kind should receive a thorough course of iodides, both for diagnostic purposes and for therapeutic effect. Very few cases of rodent ulcer are much benefitted by the iodides but occasionally one is considerably benefitted. Other measures are mild cauterizations, deeper cauterization and other measures mentioned under chancroid. The X-ray treatment sometimes produces prompt healing. A very important point in the treatment is rest of the parts. To secure this there must be no sexual intercourse and no unnecessary walking or standing.

URETHRITIS.

Inflammation of the urethra and also of the urethral ducts (Skene's glands) have already been considered, under Gonorrhoea.

PERIURETHRAL ABSCESS.

This term is applied to an abscess situated outside of the urethra but due to infection from the urethra. It usually lies between the urethra and vagina. The pocket of pus may or may not communicate with the urethra. This condition is known also as "urethrocele," "sacculation of urethra," "sinus of urethra," "urethral diverticulum" and "suburethral abscess."

Etiology and Pathology. In some cases there is infection of a urethral gland which becomes somewhat obstructed and dilated with pus and is accompanied with considerable inflammation and infiltration and pus formation outside the gland. In other cases there is probably first either a congenital cyst or a cyst formed by obstruction of the duct of one of the urethral glands which becomes markedly dilated by accumulating secretion. Later there is infection of the cyst by rupture or otherwise, and consequent abscess. It is supposed also that injuries in labor may lead to localized dilation, sacculation and suppuration.

In either case, as the collection of fluid increases in size a swelling appears in the anterior vaginal wall below the urethra (Fig. 285). In some cases the vaginal wall over the swelling is normal, while in other cases there is much infiltration and thickening and induration. The abscess frequently ruptures into the urethra and empties itself incompletely. It may continue for weeks or months partially filled with pus and decomposing urine, and discharging through a small opening. In other cases there seems little or no active inflammation and no discharging sinus, simply a collection of fluid resembling a cyst. In such a case there may be simply a retention cyst without infection or there may have been an infection that died out without forming pus.

Symptoms and Diagnosis. When there is an acute abscess, there are all the ordinary evidences of inflammation with urethral irritation added, causing frequent painful urination. In some cases there still remain evidences of the urethritis that was responsible for the periurethral infection. There is a reddened tender indurated swelling of the anterior vaginal wall under the urethra. The swelling and induration may be diffuse or circumscribed. If a collection of pus of any size has formed there will be fluctuation. If the abscess has opened into the urethra, pressure on the swelling will cause pus to flow into the urethra and out at the meatus. Sometimes a probe may be passed from the meatus through the opening into the periurethral cavity (Fig. 286).

When the acute inflammation has subsided, there is left simply a swelling with considerable urethral irritation. If the cavity is discharging into the urethra, the swelling may have largely disappeared. Such a pocket outside the urethra may cause urethral and bladder disturbance for months without the real condition being suspected, particularly if there is simply a sinus or small pocket with but little swelling. It may keep up a urethritis indefinitely and, if gonorrhoeal, the patient is capable of communicating the infection as long as the sinus exists. An exaccerbation of the inflammation with acute symptoms may come on at any time. Such a periurethral sinus may be the unsuspected cause of the persistent presence of pus in the urine.

Treatment. The treatment for this condition is to drain the cavity at the most dependent part, that is, where it comes closest to the vaginal wall. At this point a large opening should be made and the incision should be kept open by gauze packing or a drainage tube until the cavity heals from the bottom. The abscess cavity should be washed out with hydrogen peroxide and given the usual treatment of a suppurating cavity. When drainage is free below, the opening into the urethra usually closes prompty.

When there is only a collection of fluid without active inflammatory symptoms, the small cyst thus formed may be extirpated. In extirpation of such a mass, care should be exercised not to dissect too close to the urethra nor to the sphincter at the neck of the bladder. In either situation it is better to leave part of the cyst wall than to injure the important structures adjacent thereto. When there is simply a sinus or small pocket communicating with the urethra by a fairly large opening near the meatus, the plan may be tried of treating the cavity with various antiseptics such as hydrogen peroxide, iodoform in glycerine (10%) or silver nitrate solution (½% to 2%), injected into the cavity by way of the meatus through a small tube such as the Eustachian catheter. If this fails, then the external incision and drainage is to be employed.

PROLAPSE OF URETHRAL MUCOSA.

This affection is known also as "procidentia urethrae." It consists of a prolapse of the urethral mucous membrane, accompanied by more or less proliferation of the submucous connective tissue.

Symptoms and Diagnosis. The red projecting membrane surrounds the meatus (Fig. 283). It often bleeds easily and is somewhat sensitive to the touch, though not nearly so sensitive as a caruncle. It usually gives rise to considerable irritation, with frequent painful urination and some discharge. It is distinguished from polypus and caruncle by the fact that it surrounds, or almost surrounds, the meatus.

Marked prolapse of the urethral mucosa is not a common affection, though slight gaping of the urethra, through which the mucous membrane may be seen, is very common in women who have had urethritis or have passed through several labors.

Treatment. If symptoms are absent or slight, no treatment is necessary. If the prolapse is marked enough to be troublesome, the part may be cocainized, or the patient anesthetized, and the redundant portion of mucous membrane excised and the wound closed by sutures. It is convenient to pass the sutures first, then excise the tissue, then tie the sutures. This prevents the inner edge from retracting out of reach. The sutures should be placed close enough together to close the wound and prevent hemorrhage.

Another good method of excision is to begin at one side and divide the tissues for a short distance and immediately close the resulting wound by suture, continuous or interrupted as preferred. Another portion is then divided and the wound closed as before. This process is continued until the redundant tissue is removed all the way around. This prevents hemorrhage, prevents retraction and secures good approximation. Clean excision with the knife or scissors followed by immediate suture of the wound is decidedly preferable to cautery amputation. Fine catgut is the preferable suture material.

URETHRAL CARUNCLE.

Urethral caruncle is a small papillary growth occurring about the meatus, most frequently near the lower portion. It is usually very sensitive and often gives rise to excruciating pain on urination. It is known also as "irritable caruncle" and "urethral angioma." The cause of urethral caruncle is not known. Probably chronic inflammation of Skene's glands has some influence in its causation, as it usually occurs in the neighborhood of the gland openings. Inflammation of the urethra, particularly gonorrhoeal inflammation, is supposed to be a causative factor.

The little tumor is essentially a vascular growth. Skene, who made a special study of urethral neoplasms, applied to caruncle the term "papillary polypoid angioma" and gave the following description. "It consists of a bunch of dilated capillaries, set in a moderately dense stroma of connective tissue, covered with mucous membrane which has the usual pavement epithelium. One case, however, is recorded where the pavement was replaced by columnar epithelium. The vessels are greatly dilated and in some cases very tortuous, while in others less so."

The growth is seen as a deep red mass at the meatus (Fig. 284) or just within the canal. It is sensitive when touched and may bleed easily on manipulation. It may have a distinct pedicle or a broad base. Usually there is but one growth, but sometimes there are two or more.

Symptoms and Diagnosis. The principal symptom is pain on urination. It may be slight or it may be very severe. In some cases the pain is so troublesome that the patient will hold the urine as long as possible, to avoid the suffering caused by passing it. Walking may cause pain as may also pressure of any kind, even contact of the clothing. Irritability of the bladder, as indicated by frequent urination, is usually present. Occasionally retention of urine is caused by reflex spasm. Pain and hemorrhage may be caused by sexual intercourse, and in some cases coitus is impossible. The patient's general health necessarily suffers from the constant irritation and she becomes nervous, irritable and despondent.

Polypi of the urethral mucous membrane and prolapsed mucous membrane differ from caruncle in being less vascular and less sensitive. Also, polypi are attached higher, while in prolapse of the mucous membrane the base of the mass includes the larger part, if not all of the circumference of the meatus (Fig. 283).

Treatment. The treatment for caruncle is removal. First apply a small piece of absorbent cotton soaked in cocaine solution(20%) and leave in place five minutes. Then with a hypodermic syringe inject several drops of a weaker cocaine solution (½%) under the base of the growth and wait a few minutes longer. Then clip the growth off with scissors. All the abnormal tissue must be removed. Then introduce one or more fine catgut sutures, close the wound and stop the hemorrhage.

If the base is small and the resulting wound slight and without much hemorrhage, it may be simply touched with carbolic acid or liquor ferri subsulphatis, no sutures being needed. When the growth has a broad base and the patient is very nervous or hysterical it may be necessary to give a general anesthetic. In some cases, anesthesia is required for other reasons, for example, a thorough pelvic examination or curetment or repair of pelvic floor, and in such a case the caruncle may be taken care of at the same time. The urethral and bladder irritation usually subsides rapidly after the growth is removed.

While the patient is waiting for operation, some temporary relief may be given by the frequent application of cocaine solution (5% to 10%).

INFLAMMATION OF VULVO-VAGINAL GLAND.

Inflammation of the duct of the vulvo-vaginal gland and of the gland proper, has been considered under Gonorrhoea. Inflammation in this gland of Bartholin is sometimes referred to as "Bartholinitis."

ABSCESS OF VULVO-VAGINAL GLAND.

The cause is infection with the gonococcus or the ordinary pus germs. The first is by far the more frequent, and the gonorrhoeal inflammation often persists in the gland long after the vaginal inflammation has disappeared.

The infection enters at the mouth of the duct and progresses along the duct to the gland proper. The secretion of the gland is increased, the duct becomes obstructed and a collection of pus forms, distending the gland and pointing in the direction of least resistance. Sometimes the duct alone is involved, the gland proper escaping. This is indicated by the swelling being small and confined to the region of the duct.

Symptoms and Diagnosis. The symptoms are a painful swelling at the side of the vaginal opening with some fever. Examination reveals a swelling the size of a small egg situated in the tissues at one side of the vaginal orifice and projecting beyond the median line (Figs. 264, 265). The swelling is tender on pressure and is red and hot. Fluctuation is distinct and the fluid seems near the surface. The orifice of the duct may be seen, but a probe will not enter the gland because the duct is obstructed. If the obstruction is so slight that it gives way before the probe, then pus is discharged through the duct.

The following conditions may be confounded with abscess of the vulvo-vaginal gland.

CYST OF VULVO-VAGINAL GLAND. This is a chronic affair, the patient usually giving a history of the swelling having been there for a long time and the inflammatory signs (heat and pain and redness) are absent.

PUDENDAL HERNIA. This must always be taken into consideration in determining the character of a swelling of the vulva. Hernia presents one or more of the hernial signs, such as impulse on coughing, reducibility, intestinal obstruction, resonance on percussion. The first evidence of hernia is usually noticed at once after some straining effort or injury, much more promptly than either abscess or cyst would appear.

TUMOR OF LABIA. This differs from abscess in the absence of inflammation and fluctuation, in growing slowly and in presenting the signs that distinguish the various kinds of vulvar tumors.

Treatment. Open the abscess freely by an incision where the pus is nearest the surface, wash out the cavity with hydrogen peroxide and pack with antiseptic gauze. The wound should be dressed the next day and as frequently thereafter as is necessary to keep it clean. Care must be taken that a good sized piece of gauze projects into the cavity, that the edges of the incision may be kept separated untii the cavity granulates from the bottom. If the incision into the abscess is not made when the patient is first seen, but is postponed to another day, much relief in the meantime may be obtained from the application of a hot poultice. Direct the patient to take a large thick piece of absorbent cotton, wring it out of very hot water and apply it immediately to the inflamed structures and cover it with a piece of oiled-silk. This hot moist dressing may be held in place with a T-bandage. It may be renewed as soon as it begins to cool, if the pain is troublesome.

SINUS OF VULVO-VAGINAL GLAND.

In many cases of abscess of the gland, after the pus is discharged the cavity closes entirely and there is permanent cure. In other cases a sinus persists, giving rise to a constant slight discharge. The outer end of the sinus may close and a reaccumulation of pus take place, forming another abscess. This may be repeated several times in the course of a few years. Again, in inflammation of the vulvo-vaginal gland, the duct may remain open giving exit to the pus as it forms and constituting a sinus or discharging tract.

The diagnosis of sinus of the vulvo-vaginal gland is made by the history of inflammation of the gland associated with a sinus in that locality. By palpating the gland (Fig. 51), it can often be felt as a small hard lump, indicating infiltration and enlargement. Pressure on this lump will sometimes cause pus to flow from the sinus. A small probe introduced into the sinus passes into the region of the gland.

Treatment. If the sinus has a good-sized external opening and has been present only a few weeks, it may close if washed out daily with hydrogen peroxide. The peroxide should be forced to the bottom of the sinus and it may be followed by iodoform in glycerine (10%) or argyrol (25%) or protargol (5% to 10%) or silver nitrate solution (2% to 5%). In most cases however the only way to effect a permanent cure is to extirpate the sinus tract and the infiltrated gland.

This is a small operation, but the patient will usually require a general anesthetic, for considerable dissection is necessary. The parts are very vascular and there is much oozing. The resulting cavity is closed with sutures. The sutures serve also to stop the bleeding and ligatures are seldom necessary. Quite a depression is left where the inflamed gland was situated. This depression is not of particular importance and in time becomes less pronounced. It is well, however, to mention to the patient before operation that a small depression will be left when the inflamed gland is removed.

When beginning the operation, in addition to the usual antiseptic measures, the sinus should be washed out thoroughly with peroxide and then with bichloride, During the operation, care must be exercised to avoid contaminating the cut surfaces with pus from the sinus. The object is to remove all the infected tissue and secure union of the wound by first intention.

CYST OF VULVO-VAGINAL GLAND.

A cyst of the vulvo-vaginal gland is due to an obstruction of the duct, with accumulation of secretion in the gland causing it to become dilated. In some cases of inflammation, gonorrhoeal or otherwise, cyst of the gland, instead of abscess, results. The cyst appears as a fluctuating swelling in the region of the gland (Fig. 266).

The swelling is not painful and the skin may be moved freely over it. The form and location of the swelling is like that of abscess, but none of the acute inflammatory symptoms are present. Sometimes the duct only is the seat of the cyst. In that case the swelling is small and is situated at some part of the course of the duct.

The only affection that is liable to be confounded with this cyst is pudendal hernia. The distinguishing characteristics of hernia are marked increase of the trouble on straining, obstructive bowel disturbance, impulse in the mass on coughing, tympanitic percussion note over the mass (if containing bowel) and the possibility of partial or complete reduction into the peritoneal cavity.

Treatment. An attempt may be made to secure obliteration of the cyst without a cutting operation. Cleanse the inner side of the cyst and introduce the needle of a small aspirator or a hypodermic syringe and **draw off the contents** as completely as possible.

The labia minora and the tissues lying to the outer and anterior part of the cyst are full of veins and must be avoided. The bulb of the vestibule also, which lies against the upper end of the cyst, should be avoided. If the needle is introduced through any of these structures a troublesome hematoma may result. Conquently all punctures of the cyst should be made at its inner and lower portion, just at the margin of the vaginal mucous membrane where the intervening tissues are thin and comparatively free from veins.

After the evacuation of the cyst, a pad of cotton or gauze should be applied over it and held firmly against it by a T-bandage. As soon as the patient reaches home she should go to bed and remain there for two or three days, keeping the bandage applied firmly. If swelling or pain appears, elevate the hips on a pillow and apply an ice-bag.

If the cyst refills, the contents may again be drawn off and some irritating fluid injected into the cavity as in the **injection treatment** for ordinary hydrocele.

There are two cutting methods. One method is to **open the cyst** on the inner side, cut out some tissue on each side of the incision, so that it will not close so easily, curet the inner surface of the sac and pack with antiseptic gauze. The external wound is kept open until the cavity is obliterated. In this method the treatment is prolonged and a sinus may result.

The other method is to **extirpate the cyst.** In extirpating the cyst, avoid cutting into it if possible, as it is much easier enucleated when distended than when collapsed. The resulting cavity is closed with sutures. This method is the one of choice from the very first in all cases in which there is no contra-indication to general anesthesia.

When the patient is not in good condition for a general anesthetic, the cyst may in some cases be extirpated by injecting a considerable quantity of a weak cocaine solution (¼% to ½%) or the Schleich solution No. 2 (See Formulæ) around the cyst and under it (infiltration method). This will do away with the greater part of the pain. To facilitate the dissection in such cases, Pozzi adopted the very ingenious plan of filling the cyst with paraffin. The cyst is first punctured and the fluid drawn off. The cavity is then washed out with hot water and the melted paraffin is introduced at a low temperature. When the cavity is distended, ice is applied and in a few minutes there is formed a solid mass, which is extirpated under the anesthesia of the cold and cocaine.

CONDYLOMATA OF VULVA.

Condylomata are small non-malignant growths occurring about the vulva. There are three varieties.

1. The common wart, called also "verruca vulgaris."
2. The pointed condyloma, called also "condyloma acuminata," "venereal wart" and "moist wart."
3. The flat condyloma, called also "condyloma lata."

Etiology, Pathology, Symptoms. The common WART occurs rather frequently about the vulva. It is usually situated on the labia majora or mons veneris. The particular cause for it is not known. It is dry and sometimes much pigmented, but rarely causes any disturbance.

The POINTED CONDYLOMA or moist wart occurs on those parts of the vulva which are frequently moist, namely, the vestibule, the vaginal entrance, the labia minora, the perineum and about the anus. In some cases they occur on the labia majora and even on the thighs.

They are usually associated with venereal disease but not necessarily so. They are small pointed papillary masses with a thin covering of epithelium. They occur singly or in groups or in large numbers (Figs. 257, 258). They may vary in size from the head of a pin to a large cauliflower mass covering half or more of the vulva (Figs. 259, 260).

They are due to some irritating discharge, usually gonorrhoeal. Sometimes they are due to a simple discharge as, for example, the increased vaginal flow of pregnancy. When present during pregnancy they grow very rapidly. Whenever they are found, a careful search should be made for evidences of previous gonorrhoea.

Usually condylomata are not particularly painful nor tender. In some cases they become inflamed and are then painful and may bleed easily. When the condylomata are multiple and grouped together in large masses (Fig. 259), secretion is liable to lie in the interstices of the growth and become decomposed, giving rise to an offensive odor and considerable irritation. If situated near the meatus, considerable bladder irritability may result.

The FLAT CONDYLOMATA (Figs. 261, 262) constitute the characteristic vulvar lesions of secondary syphilis. If the overlying epithelial layers are thrown off, the flat condyloma becomes a superficial ulcer, as mentioned under syphilis.

Treatment. The **common wart** needs no treatment unless large or in some way troublesome. In such a case it may be removed the same as warts elsewhere, viz.: by injecting a few drops of cocaine solution beneath it and then snipping it off with the scissors. The base should be touched with carbolic acid or other cauterant, to check the bleeding and prevent return of the wart. If the bleeding is free, it may be checked with one or two sutures. If the patient objects to this excision of the wart, the cannabis Indica and salicylic acid mixture (see Formulæ) may be applied. This is to be painted over the wart with a camels-hair brush. It should be applied freely morning and evening, the hard crust over the top of the growth being occasionally removed, that the medicine may penetrate deeper. This treatment continued for a week or two will often cause the wart to disappear, but it does not always do so. This treatment is rather tedious and uncertain, but it is not painful and patients frequently prefer it.

The **pointed condylomata** are treated as follows:

1. Stop the irritating discharge which causes the condylomata. This requires an antiseptic vaginal douche, once, twice or thrice daily, depending on the amount of discharge. The douche removes the discharge from the vagina and prevents it irritating the structures around the vaginal entrance. In addition to the douche, the patient will probably require special treatment as indicated by the nature of the disease giving rise to the discharge.

2. Keep the condylomata clean and dry. This is accomplished by washing several times daily with an antiseptic solution, for example, bichloride (1 to 2000) and then drying with absorbent cotton and dusting freely with some drying powder such as calomel or equal parts of bismuth subnitrate and prepared chalk or equal parts of salicylic acid and calomel. The powder composed of tannic acid, boric acid and xeroform (see Formulæ) does well, as does also the resorcin powder (see Formulæ). The patient is given a prescription for the required powder and directed to dust it on freely several times daily. In the office treatment, silver nitrate stick or a strong solution may be applied as a cauterant, or carbolic acid may be used as a cauterant, after anesthetizing the growth by the application of cocaine solution

(20%). Another excellent cauterant application is pure formol, applied after the use of a cocaine solution to prevent pain.

3. Excision. This is the best plan to adopt when there are only a few separate condylomata. The growths are snipped off with the scissors and the base of each touched with carbolic acid or liquor ferri subsulphatis to stop the bleeding. If the base is wide and considerable pain is anticipated, a few drops of cocaine solution ($\frac{1}{2}$ %) may be injected under the growths before excision. If there is free bleeding the little wound may be closed with a suture. When a large mass has formed (Fig. 259) with a broad and vascular base, perhaps extending into the vagina, it is better to give the patient a general anesthetic and remove the growth thoroughly with the scissors and curet.

In PREGNANCY it is well to get along if possible with local cleanliness and drying powders and mild astringents. Any operative measure, such as excision of the condylomata or cauterizing them, may lead to miscarriage. In many cases the simple measures above mentioned will effect a cure. But when the condylomata are not cured by the simple means, particularly if the growth is extensive, the patient should be anesthetized and the mass entirely removed. Though miscarrige or premature labor may result from such treatment, it is not probable and with such a case some risk must be taken. If large condylomata, that retain secretion in the crevices, are allowed to remain until labor, they become a source of great danger to the mother on account of the liability to puerperal sepsis. There is danger to the child also, particularly in gonorrhoeal cases, because of the liability to eye-infection and destructive ophthalmia.

The **flat condylomata** require the regular constitutional treatment for secondary syphilis. Locally, cleanliness should be secured by frequent washing with a carbolic or other antiseptic solution. If there is much vaginal discharge, antiseptic vaginal douches should be given. Each time the parts are washed, they should be dried thoroughly with absorbent cotton and dusted freely with some drying powder. Calomel makes an effective drying powder in these cases.

If there is troublesome itching or smarting, the lesions may be touched occasionally with silver nitrate solution (10%). If an ulcer forms it requires the treatment for ulcer, given elsewhere.

CYSTS OF VULVA.

Occasionally sebaceous cysts occur on the labia majora or the mons veneris. They present the same characteristics and require the same treatment as sebaceous cysts elsewhere. Figs. 278 and 279 show large labial cysts. Cysts of the vulvovaginal gland have already been considered.

Several cysts of the labia minora have been reported (Fig. 277). It is generallly supposed that they arise from embryologically misplaced glandular rests. If large enough to be troublesome they are to be excised. Fig. 280 shows a cyst of the clitoris.

CYSTS OF VAGINA.

Vaginal cysts are rare and their origin is not certain. Some are supposed to arise from the remains of the duct of Gartner, but others are found in other situations. Vaginal cysts vary in size from the end of the finger to as large as the fist and even larger (Figs. 305, 306). In some cases the vaginal wall is separate from the cyst and moves freely over it, while in other cases the vaginal wall is closely adherent to the cyst, apparently forming part of it.

The contents of the cyst may be like serum or may be milky or may be dark and thick, the color and consistency depending on the amount of hemorrhage into the cyst cavity.

Diagnosis. The cyst differs from vaginal HERNIA in that it is of gradual development and without apparent cause, gives, on coughing, no impulse separate from the adjacent vaginal wall, can not be reduced and is not associated with intestinal disturbance. The cyst differs from vaginal ABSCESS in that inflammatory symptoms are absent. In some cases, infection of the cyst contents takes place and the cyst becomes an abscess. In such cases it is distinguished from a simple abscess by the presence of a swelling long before the inflammatory symptoms developed. In some cases a swelling that appears to be a vaginal cyst is simply a pocket from the urethra (suburethral abscess). Before subjecting a patient to operation, it is well in a doubtful case, to draw off a small quantity of fluid from the supposed cyst with an aspirator that the diagnosis may be confirmed.

Two other conditions that should receive attention in the differential diagnosis of vaginal cyst are, double vagina and double ureter. In a case of DOUBLE VAGINA the second vagina may be completely shut off and filled with old menstrual blood. It would usually be somewhat larger and less tense than the ordinary vaginal cyst, though the latter are frequently of considerable size. There would be double uterus and the relation of the mass to the uterus would point to one-sided hemato-colpos. From HYDRO-URETER or a supernumerary ureter, the differentiation would also be rather difficult and depend principally on the shape and tension of the swelling. In a case of double ureter, if one ended blindly along side the vagina and became distended with urine it would form a mass which would be more sausage-shaped and have less tension than a vaginal cyst. A puncture of the mass with an aspirating needle, of course, aids greatly in differentiating between these conditions—the presence of blood speaking for hemato-colpos, and of urine for hydro-ureter.

Hernia must be carefully excluded before aspirating, or fatal peritonitis may result. If it is intended to remove the cyst by operation, only a small amount of fluid should be removed for diagnostic purposes, for the extirpation is more easily carried out when the cyst is distended than when collapsed.

Treatment. If the cyst is large and troublesome, the most satisfactory way of dealing with it is by extirpation, provided it is situated in the lower part of the vagina where complete extirpation is practicable. If it is so situated that it can not be completely extirpated, remove a large part of the wall, curet the remaining portion and pack with gauze, and treat as an abscess cavity. If the patient is averse to operation, the cyst may be simply emptied by aspiration. There is a possibility that it will remain collapsed for sometime or even permanently. However, the probability is that it will refill in a short time and that extirpation will be necessary.

If the cyst is first discovered during pregnancy, do not disturb it until labor begins. When labor comes on and the child's head is beginning to press into the pelvis, empty the cyst with an aspirator, to give room for the passage of the child. Do not attempt extirpation of the cyst nor incision and drainage, until the patient has recovered from parturition.

NON-MALIGNANT TUMORS OF VULVA.

Fibrous tumors (fibromata) may occur in the connective tissue of the vulva. They are rare. When present they usually involve one of the labia majora (Figs. 275, 276).

In some tumors there are also bundles of muscular tissue, evidently derived from the muscle fibers of the round ligament or of the skin. Such tumors are of course fibro-myomata. Other tumors have a preponderance of fat (lipomata), the connective tissue simply forming trabeculae between the fat lobules. Still other tumors contain myxomatous tissue, giving the myxo-fibromata and the myxo-lipomata. A very rare form of tumor in this region is the chondroma. A few cases of chondroma of the clitoris have been reported, in at least one of which considerable ossification had taken place.

These non-malignant tumors of the vulva may vary in size from an acorn to a child's head. They present, in this locality, the same symptoms and signs that characterize them elsewhere. The patient complains principally of the weight of the growth and of its being in the way. When large, they become pedunculated. On account of the friction the surface may become abraided and infected and ulcerated, adding greatly to the patient's distress. The treatment for these growths is excision.

NON-MALIGNANT TUMOR OF VAGINA.

Solid tumors (fibrous and myomatous) occasionally develop in the vaginal wall. Such a tumor may be mistaken for a hernia or a cyst or a malignant tumor. Solid tumors in this situation are so rare as to require no detailed consideration, but the possibility of their existence must be kept in mind when endeavoring to determine the character of a swelling in this region.

When large enough to cause trouble, they require the same treatment as vaginal cysts, i. e. extirpation.

STASIS HYPERTROPHY OF VULVA.

Stasis hypertrophy of the external genitals is a chronic enlargement of the same, due principally to interference with the lymph circulation. "Elephantiasis" is the term under which most authors describe this condition, but the import given to this word varies so much that its use leads to confusion. It has been applied on the one hand indiscriminately to nearly all chronic enlargements of the labia and, on the other hand, as a special term for the designation of the swelling due to the local invasion of the lymph channels by a parasite (filaria sanguinis hominis). To prevent this confusion I think best to adopt another term, one about which there can be no misunderstanding and which indicates the most important factor in the evolution of the clinical picture. The essential lesion is a stasis hypertrophy, whatever the cause of the stasis may be. As explained below under etiology, the stasis may be due to persistent ulceration with resulting scar tissue, or to an obstructive disturbance in the inguinal lymph glands or to local invasion of lymphatics by a parasite (filaria). The term "ulcus rodens" given to the condition by some writers, is very good for designating that peculiarly persistent form of ulceration which is a prominent feature in many of these cases, but as a term for the whole clinical picture it is not appropriate. The hypertrophy may be present without ulceration and, on the other hand, a rodent ulcer may be present without particular hypertrophy. Stasis hypertrophy does not include the following forms of vulvar enlargement:—

a. Malformations, nor the condition known as "congenital elephantiasis," which is in reality a kind of soft fibroma.

b. The slight enlargement of one or both labia minora, without lymph obstruction and which is supposed to be due to frequent irritation of the structures.

c. The enormous enlargement of the labia minora seen in some barbarous tribes, particulariy the Hottentots (Fig. 268). This is due not to lymph stasis but to certain manipulations practised on the female children, particularly stretching of the parts manually or by weights.

d. Fibroma, lipoma, hematoma, carcinoma, sarcoma, ordinary edema, acute inflammatory enlargement, hernia.

e. The slighter degress of enlargement found in the various forms of vulvar ulceration, namely, in the syphilitic, tubercular, malignant and rodent ulcers. In each of these conditions, when present for some time, there is usually slight stasis hypertrophy, but the disease giving rise to the ulceration is the important feature and hence the case should be classed under syphilis or tuberculosis or malignant disease or rodent ulcer. However, with syphilis or rodent ulcer, as the case continues the hypertrophy may in time become the most important feature and then the case could properly be classed as one of stasis hypertrophy. If this fact of the possible overlapping of these terms were kept in mind and yet a definite meaning were attached to each term when used, much confusion would be avoided. I think the term "elephantiasis" should be reserved for those cases of vulvar enlargement in which the enlargement becomes very great, i. e. of really elephantine proportions (Fig. 255).

Etiology. There are supposed to be three causative factors:

1. Chronic ulceration about the vulva. This has long been recognized as an etiological factor in the majority of cases. In most cases, the ulceration spreads at one point and heals at another, forming scar tissue. The contraction of the scar tissue, and of the inflammatory infiltration under the ulcer, obstructs the circulation, particularly of the lymph, and causes stasis, chronic irritation, infiltration and hypertrophy of the tributary structures. This same ulceration may lead to infection of the lymph glands and the obstructive condition mentioned in the next paragraph. In Fig. 254, the masses are raised to show the ulceration beneath.

2. Obstructive changes in the inguinal lymphatic glands. This factor was brought out by F. Koch, and helps to account for those cases in which there has been no extensive ulceration. The obstruction of the lymph glands by disease of these structures may be an important factor also in those cases accompanied by, and apparently due to, chronic ulceration. The closing of these lymph highways

through the glands may be brought about by extirpation of the glands or by suppuration of the same, or even by inflammatory or degenerative processes that stop short of suppuration, such, for example, as tertiary syphilis.

3. Local invasion of the vulvar lymphatics by the filaria sanguinis hominis. This is rare or unknown in this country, but it occurs as an endemic affection in some countries (India, Barbadoes and the Antilles). Mosquitoes are supposed to deposit the embryo beneath the epidermis. There the parasite multiplies to such an extent as to choke the lymph channels, the obstruction being due to both the parasites proper and the ova.

Stasis hypertrophy is a rather common affection among prostitutes, in whom the constant irritation from frequent coitus and from various infections and from lack of cleanliness, tends to keep up indefinitely the chronic ulceration, which usually precedes and accompanies the hypertrophy. In this class, chronic ulceration is favored also by the depressed general health and in many cases by tertiary syphilis or the post-syphilitic state. The post-syphilitic state probably predisposes to stasis hypertrophy by producing poor tissue resistance which favors chronic ulceration, and also by producing a change in the local lymph glands which interferes more or less with the flow of lymph through them.

Pathology and Symptoms. There is marked hyperplasia of the skin and subcutaneous tissues, and the lymph spaces are dilated. There is usually considerable round-cell infiltration and connective tissue proliferation. In some cases there is infection of the lymph spaces and the formation of pockets of pus, but this is not a part of the essential pathology of the disease. In the absence of infection, there are no evidences of acute inflammation in ordinary stasis hypertrophy.

The enlarged structures have about the normal color. The skin may be smooth (glabrous variety) or rough and warty (verrucous variety) with marked exaggeration of the normal skin folds. The process may effect the clitoris alone or one of the labia alone or it may affect all of these structures simultaneously or in succession.

There is usually present more or less chronic ulceration. In that variety due to the filaria, the parasite and ova are found choking the lymph spaces and there are also evidences of acute inflammatory reaction. The enlargement in stasis hyper-may vary in size from a small thickening, hardly noticeable, to a mass so large as to prevent coitus and interfere with walking (Figs. 249 to 253)

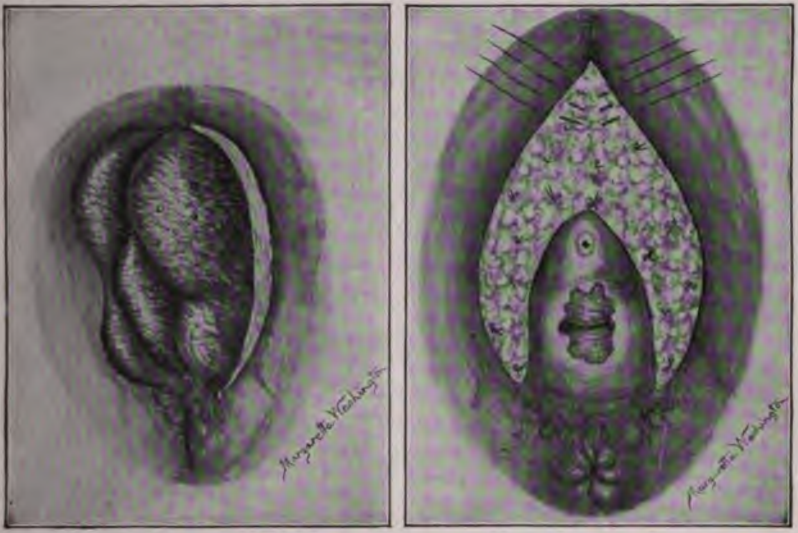
Examination reveals the enlargement and usually also the ulceration and scar tissue. In the absence of infection, there are no acute inflammatory symptoms and usually but little congestion.

The patients complain of some discharge and itching about the genitalia and not infrequently symptoms of irritation on the part of the bladder and rectum. What usually brings the patient to the physician is the discharge and enlargement, with resulting discomfort and inconvenience in walking and difficulty in coitus.

Diagnosis. Tertiary syphilitic lesions of the vulva not infrequently resemble the affection under consideration, there being present syphilitic ulceration and syphilitic deposit in the tissue. For this reason a thorough course of iodides is advisable in nearly all these cases as a diagnostic measure. In some supposed cases of simple stasis hypertrophy, when the patient is put on anti-syphilitic treatment the ulcers heal rapidly and the swelling rapidly disappears, showing that the trouble was syphilis and not ordinary stasis hypertrophy. However, the post-syphilitic state undoubtedly predisposes to chronic ulceration with resulting stasis hypertrophy, and a large number of the persons so afflicted are old syphilitics. That it is not syphilis in the active stage, is shown by the therapeutic test—the iodides rarely doing much good.

From stasis hypertrophy we must distinguish also **tuberculosis** of the vulva and malignant disease, by the special diagnostic points given under each. To be distinguished also are fibroma, lipoma, hernia and the enlargement of the labia minora previously mentioned.

In that rare form of stasis hypertrophy due to the filaria, considerable acute inflammatory reaction follows the invasion of the lymph spaces by the parasite and at this stage it is very liable to be mistaken for erysipelas or ordinary **cellulitis.** After these acute symptoms subside the brawny induraton remains. Acute exacerbations occur at irregular intervals and with each exacerbation there is a decided increase in the hypertrophy. If pus infection of the dilated lymph spaces takes place, abscesses and sinuses form.



A. B.

Fig. 485. Excision of External Genitals. A. Showing enlarged labia (stasis hypertrophy), with the incision made on the left side. B. Showing the wound left when the diseased structures are removed. The bleeding vessels are tied and the suturing is begun. (Hirst—*Diseases of Women.*)

Treatment. The treatment of stasis hypertrophy is naturally divided into two parts—that for the ulceration and skin irritation, and that for the swollen structures.

The first consists in **cleanliness** and the employment of the measures mentioned under ulcer and under vulvitis.

The second, i. e. treatment for the large masses, is **excision.** In some of the milder cases the removal of the irritation and dermatitis and the treatment of the ulceration, will do away with part of the swelling (the coincident edema) and relieve the patient so much that she is comfortable. In most cases, however, particularly where the enlargement is marked, the masses should be removed. In some cases the masses are so much in the way that they must be removed before the ulceration can be satisfactorily treated. But on account of the danger of infection the ulceration should be healed as far as possible and all the dermatitis removed before excision of the mass. Infection is particularly dangerous in these cases on account of the great dilatation of the lymph spaces, and strict antiseptic care must be employed in handling them.

The best way to remove such a mass is by clean excision with the knife or scissors and closure of the resulting wound with sutures (Fig. 485). Bleeding is free and many artery forceps are needed to catch the small vessels. When there is a large mass with a broad pedicle, it is best to close the wound immediately, a little at a time as the incision is extended and the mass gradually excised. In this way the sutures stop the bleeding at once, no ligatures are necessary and comparatively little blood is lost.

The older method of removal with the cautery leaves a broad surface to heal by granulation and there is much resulting scar tissue and distortion. Except in the cases of very small pedicle, it is inferior to excision with the knife. The knife-excision leaves the edges of the wound in condition for accurate approximation and rapid union with a minimum amount of scar tissue.

PUDENDAL HERNIA.

A pudendal hernia is a protrusion of the intestine or omentum or other intra-abdominal structure into the external genitals. It may take place by way of the inguinal canal, in which case the hernia is designated as "inguino-labial" or "superior labial."

The protrusion may take place by way of the vagina, in which case the hernia is designated as "vaginal," "vagino-labial" or "inferior labial."

Inguino-labial hernia. The round ligament ends in the tissues at the top of the labium majus. In the fetus, the ligament is accompanied along the inguinal canal by a prolongation of the peritoneum, forming a small cavity. This is usually obliterated in the full term fetus. In some cases, however, it is not obliterated but remains open, forming a small pocket or "canal of Nuck," and along this canal an inguinal hernia may take place. The hernia may advance no further than the inguinal ring or, on the other hand, it may protrude more and more, involving the upper part of the labium majus and later the whole labium (Fig. 281). It corresponds to scrotal hernia in the male and presents practically the same pathology and symptoms. In some cases other structures than the intestine or omentum have been found in such a hernia-sac, for example, the ovary, Fallopian tube, uterus and even the pregnant uterus.

Vagino-labial hernia. In rare cases a hernial protrusion may take place through the pelvic outlet by way of the vagina. In such a case the hernia may descend in front of the broad ligament, between the uterus and the bladder or, more rarely, behind the broad ligament between the uterus and the rectum. In either case the hernial tumor appears first in the vagina and, as it grows larger, approaches the vaginal opening and distends the lower part of one labium (Fig. 282). In this situation it produces an appearance somewhat resembling a vulvo-vaginal cyst, for which it may be mistaken.

Diagnosis. Hernia differs from other swellings in this region, for example, hematoma, cyst, fibroma, stasis hypertrophy, cellulitis, in the following particulars:

IMPULSE ON COUGHING. This sign, however, may be absent if strangulation has taken place.

RESONANCE ON PERCUSSION. This sign is present only if the mass contains intestine. It is not found with omentum or ovary or tube.

MAY BE REDUCED INTO ABDOMINAL CAVITY. This, of course, is possible only in reducible hernia. If the supposed hernia cannot be reduced with the patient in the dorsal position, she may be placed in the knee-chest posture and the reduction again attempted. This is especially effective in the vaginal form of hernia.

INTESTINAL OBSTRUCTION. Usually there is not enough obstruction to produce serious symptoms nor interfere with the passage of the intestinal contents, but when evidence of such obstruction does occur it is a very important diagnostic symptom.

HISTORY. Hernia usually appears in conjunction with some straining effort. Hematoma of the vulva is usually due to some external injury. Cellulitis follows a wound or ulcer. Stasis hypertrophy is preceded by chronic ulceration and scar tissue formation. The other swellings of this locality (cyst, tumor) develop gradually and without apparent cause.

Treatment. The treatment for hernia in this situation is the same as for hernia elsewhere, namely, reduction and retention of the replaced viscera within the abdominal cavity, if that can be satisfactorily accomplished. An INGUINO-LABIAL hernia can frequently be retained with the ordinary hernia truss. If the reduction can not be accomplished or if satisfactory retention can not be secured, then the operation for the radical cure of the hernia is indicated.

In the form of pudendal hernia in which the protrusion takes place by way of the pelvic outlet and vagina (VAGINO-LABIAL), there is seldom enough obstruction at the hernial opening to produce troublesome symptoms. When the patient is placed in the knee-chest posture, the protruding mass returns within the abdominal cavity and in some cases satisfactory retention may be secured by means of a pessary that puts the vaginal walls on the stretch or that plugs the vaginal canal. Various forms of pessary may be tried until an effective one for that particular case is found. In some cases the uterine supporter, consisting of an abdominal belt and vaginal stem supporting a hard rubber cup or ball (Fig. 462), is the most satisfactory form for the vaginal hernia.

Where only temporary retention is needed, as at the beginning of labor, the vagina may be packed with gauze or cotton and the patient kept in bed and if necessary in Sim's posture, or in the dorsal posture with hip elevated on pillows. If the hernia still persists in coming down, the patient may be propped up for a time in a modified knee-chest posture, care being taken that the abdomen is free from constriction or pressure, so that the intestines may fall to the upper part of the abdominal cavity. A vaginal hernia associated with pregnancy and labor makes a serious complication and requires careful handling, for there is always the danger that the hernia may be caught and held in front of the advancing head, with fatal results.

A vaginal hernia causing serious symptoms, which canot be relieved by other measures, requires operation for the permanent closing of the hernial opening. In a case in which the hernial opening can be satisfactorily reached for operative closures by way of the vagina, that route for the operation should be chosen as it is less dangerous.

In other cases abdominal section is indicated.

PUDENDAL HYDROCELE.

In some patients, a canal persists along the round ligament, the internal end of the canal being closed. If a collection of fluid takes place in the sac thus formed, the result is a pudendal hydrocele, corresponding to hydrocele of the cord in the male. It is called also "labial hydrocele" and occupies the same location as an inguinal hernia.

It differs from hernia in that it is dull on percussion, can not be reduced, gives little or no impulse on coughing, is not associated with evidences of intestinal obstruction and has developed gradually without apparent cause. Great care is necessary in diagnosticating this rare affection, for it would be fatal to mistake hernia for hydrocele and treat it by injection. It must be differentiated also from cystic adeno-myoma of the round ligament. Several such cases have been reported. In hydrocele, the cyst wall would be thinner than in the cystic adeno-myoma, though in some of the cases the adeno-myoma can only be distinguished microscopically. Pudendal hydrocele must be differentiated also from hernia of the ovary with cystic degeneration.

Treatment. If the collection of fluid is small and causes no inconvenience, leave it alone or have the patient rub in some ointment, such as oleate of mercury, once daily with gentle massage. If the swelling causes trouble, the fluid may be drawn off and an irritating injection made, the same as for treatment of ordinary hydrocele in the male. Before employing this treatment it must be determined positively that the cavity of the sac is shut off from the peritoneal cavity.

A safer and more certain plan of treatment is to extirpate the sac, or a large part of it, and close the wound by sutures.

HEMATOMA OF VULVA.

A hematoma is a collection of blood in the tissues. The genitals are very vascular and also present much loose subcutaneous tissue into which hemorrhage may take place with but little resistance until a large mass is formed (Fig. 248).

Pregnancy, pelvic tumors and other conditions that increase the vascularity of the parts, predispose to hematoma. The exciting cause is an injury that starts subcutaneous bleeding. A severe injury caused by a fall astride some object is very liable to cause hematoma. The bruising of the tissues by the child's head in labor or by the obstetric forceps may cause hematoma. A slight subcutaneous surgical proceedure about the genitals, such as puncture of a cyst with a hypodermic needle, may be followed by a hematoma. For this reason it is important in puncturing a cyst of the vulvo-vaginal gland to make the puncture on the inner side where the intervening layer of tissue is thin and comparatively free from veins. During pregnancy the veins of the external genitals become enlarged and varicose and sometimes there is a spontaneous rupture of a vein subcutaneously, giving rise to a hematoma without external injury.

Symptoms and Diagnosis. After some slight injury, a swelling is noticed, which increases rapidly in size and is accompanied by considerable pain, especially when the patient is standing. If large, the swelling distorts the parts very much, in some cases so much that the individual structures are identified with difficulty. The swelling presents induration and, if a large collection of blood has formed, there may be fluctuation.

The swelling and pain and induration are much the same as in acute cellulitis and it may be mistaken for that affection, particularly if the hemorrhage is situated so deeply that the skin is not discolored. In one typical case, which I saw in consultation, the physician was much alarmed, fearing that he had caused a serious infection. He had punctured a small cyst with a hypodermic syringe and drawn off the fluid. Within twenty-four hours a large swelling gradually formed accompanied with much pain and distending and distorting the genitals on that side. In the next twenty-four hours the swelling seemed to get worse instead of better He decided it would be necessary to make deep incisions to stop the serious and spreading infection. When I saw the patient with him, the examination-findings together with the history, showed that the trouble was a hematoma following the hypodermic-needle puncture. Rest with the hips elevated and an ice-bag applied locally was the treatment adopted, with satisfactory result.

The differential diagnostic points between hematoma and cellulitis are that the hematoma begins to develop, within a few hours after the injury, too soon for infection to develop, and that there is little or no fever and that the tenderness on superficial palpation and the local heat are neither so marked as in acute inflammation. In a few days the extravasated blood finds its way to near the surface and colors the skin and confirms the diagnosis.

Treatment. Put the patient to bed and elevate the hips by placing a pillow under them, at the same time arranging a pillow under the knees so that the patient will be comfortable, and apply an ice-bag over the swelling. The patient should be kept perfectly quiet in this position until the hemorrhage ceases—several hours if necessary. If there is much pain, sedatives should be given to keep the patient quiet. The cessation of the hemorrhage is indicated by the swelling ceasing to increase in size and by diminution in the pain.

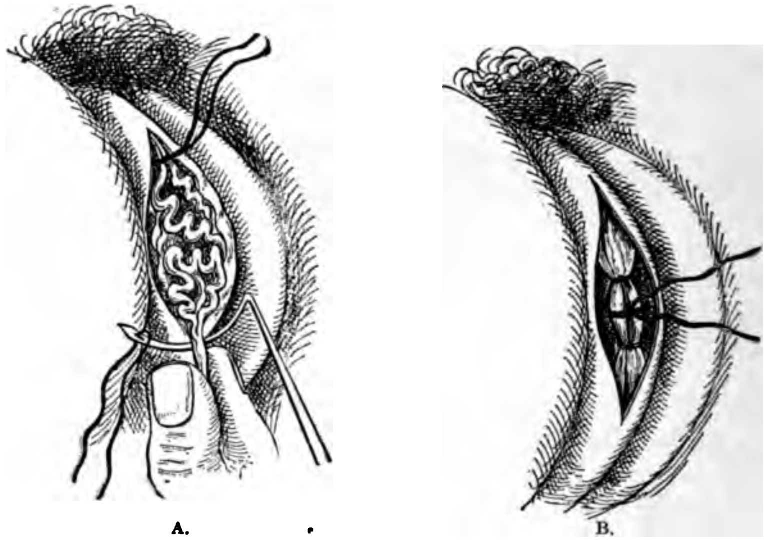
If the hematoma is very large and increasing in size, it is advisable to incise the swelling, under antiseptic precautions, turn out the clots, ligate the bleeding vessel or vessels, cleanse the cavity and obliterate it with sutures. This avoids sloughing of the skin, suppuration of the blood collection and dangerous septicemia. In the later treatment of a case in which the incision has not been necessary, the patient must be kept in bed until absorption is well under way. If suppuration takes place in the collection of blood the resulting abscess must be opened.

A large hematoma, especially if occuring in labor or advanced pregnancy, is a serious affair. The swelling may burst and fatal external hemorrhage occur or the patient may bleed to death without external opening, the blood simply burrowing in the loose subcutaneous tissues. Such a serious result is rare, but the fact that it may occur must be kept in mind and, if the hemorrhage persists in spite of the ordinary measures, the affection should be treated by operation before the patient is too weak. After the blood-clots are turned out, an attempt should be made to catch the bleeding vessels with forceps. If the particular vessel that is bleeding can not be made out, catch the bleeding tissues rapidly with forceps until the hemorrhage is stopped and then ligate the bleeding areas *en masse* or include them in sutures.

It has been recommended in these cases to stop the hemorrhage by firm packing, but valuable time may be lost in placing a packing which, after all, may fail to stop the bleeding. The safer plan in severe cases to is catch the bleeding vessels and ligate them, so that there is no chance for further loss of blood.

VARICOSE VEINS OF VULVA.

The veins about the external genitals may become markedly varicose, the irregular dilatation being due to some obstruction to the pelvic circulation, such as pregnancy or a pelvic tumor. The dilatation of the veins only rarely gives rise to troublesome symptoms. Sometimes the patient complains of itching or of tension in the parts. Sometimes she becomes alarmed on account of the enlargement and consults the physician simply to know the cause. Occasionally, however, there may be marked enlargement (Fig. 256) with aching in the parts and much irritation of the skin. The danger in these cases is that a severe hemorrhage may take place, or a large hematoma form from slight injury or from spontaneous rupture of a varicose vein.



A. B.

Fig. 486. Excision of Varicose Veins of Vulva. A. The veins have been exposed by incision through the skin, and the ligatures are being passed. B. The ligatures have been tied, the varicose veins excised and the pedicles brought together. The operation is completed by a continuous suture closing the skin-incision. (Ashton—*Practice of Gynecology.*)

Treatment. Usually no treatment is required beyond directing the patient to eep the bowels well open and to avoid lifting or straining as much as possible. nything that increases the intra-pelvic pressure or interferes with the pelvic circution tends to increase the venous dilatation. In advanced pregnancy, an abominal supporter takes some of the weight of the uterus from the anterior part of e pelvis and in that way may improve the circulation there. If the dilatation is fficient to give the patient trouble, some relief may be afforded by a pad and -bandage, so applied as to support the veins and prevent further dilatation. The tient should take the recumbent posture several times daily, and in some cases it ay be advisable to keep her in bed continuously in the later weeks of pregnancy.

If there should be subcutaneous rupture of a vein, employ the treatment given der hematoma.

If there should be external rupture, employ the treatment given below for open morrhage following injury.

When in the non-pregnant, the veins are so much enlarged that they are troubleme, they may be excised. They are exposed by an incision through skin covering em (Fig. 486-A), ligated at each end and excised (Fig. 486-B) and the stumps ought together and the incision closed by sutures.

INJURIES OF EXTERNAL GENITALS.

The genitals are in such a well-protected situation that injuries are rare. Such juries as do occur, apart from labor, are due usually to a fall astride some object to kicks and blows intentionally inflicted or to injuries in coitus.

Injuries in this locality should be treated on the same general principles that govn the treatment of injuries in other localities, viz., stop hemorrhage, secure asepsis far as possible, approximate divided tissues sufficiently to restore function and terward protect the wound with a suitable dressing.

There are two special characteristics of injuries in this locality that must be kept mind.

1. Free hemorrhage. The parts are very rich in blood vessels, particularly veins, d slight injury may cause severe bleeding, either as external hemorrhage from an en wound or as subcutaneous hemorrhage from a bruise, giving rise to a matoma.

An instance of troublesome hemorrhage from a slight injury is the persistent eeding that occasionally follows the small tear of the hymen in the first coitus. n account of modesty and embarrassment, the newly married couple hesitate to ll in assistance, and sometimes the bleeding persists for hours—until they do ally call a physician, who may find the bedding soaked with blood and the ide almost exsanguinated.

OPEN HEMORRHAGE from injury to genitals should be stopped by packing or by tures or by forceps or by ligature of separate vessels or by ligature of the bleeding sue *en masse* as indicated by the nature of the wound. After treatment of the ound, the patient should be kept in bed with hips elevated until all tendency to morrhage is past. In attempting to stop hemorrhage, either from a wound or ring an operation, if the bleeding vessels can not be made out and the bleeding is free, the most satisfactory plan is to pass one or more sutures through the bleeding area and tie them.

In case of injury about the venous masses called the bulbs of the vestibule, the hemorrhage, whether open or subcutaneous, may often be controlled by packing the vagina firmly and then puting a firm compress over the vulva, such as a folded towel held in place by a strong T-bandage making firm pressure.

In open hemorrhage from a small wound, if the pressure does not control it, the wound may be packed with pledgets of cotton dipped in liquor ferri subsulphatis or in tannic acid powder, and then the vaginal packing and vulvar compress employed.

In SUBCUTANEOUS HEMORRHAGE (hematoma) the patient should receive the treatment described elsewhere for that affection.

2. Marked swelling. In this locality the subcutaneous tissues are loose and decided swelling is liable to follow an injury, either immediately from subcutaneous hemorrhage or serous effusion or later from inflammatory exudate.

To prevent the swelling, or diminish it if present, put the patient to bed, elevate the hips and apply an ice-bag over the parts. If the swelling is from inflammation, hot applications may give more relief than the cold.

For further treatment of vulvar swelling see hematoma and also cellulitis of vulva.

KRAUROSIS VULVAE.

Kraurosis vulva is a term applied to a rather rare affection of the external genitals characterized by atrophy and shrinking of the skin and obliteration of the normal folds, and a change in the consistency of the epidermis by which it becomes somewhat like scar-tissue. It is known also as "atrophy of the vulva," and as "progressive cutaneous atrophy."

The essential cause is not known. It has, in various cases, been preceded by eczema and other chronic inflammatory diseases of the vulva, by pruritis vulvae, giving rise to much scratching and irritation and excoriation, by removal of the uterine appendages and by chronic vaginal discharge. It has, to some extent, been attributed to each of these conditions, but apparently none of them constitute the essential factor in its development.

Age seems to be a definite factor in the etiology, for it occurs almost exclusively in women near or past the menopause. This would seem to indicate that it is in some way connected with senile atrophic changes. As cutaneous atrophy is such a marked feature of the affection, it has been surmised that it is due to an atrophic affection of the nerves of the parts, and marked changes in the nerves have been demonstrated. But whether such changes are primary or secondary is somewhat uncertain.

Pathology and Symptoms. In the beginning there is a low-grade inflammatory process, which appears in spots just outside the vaginal opening or on the labia. The spots are hyperemic (reddened) and may be slightly swollen but are usually depressed. In the beginning, hypertrophic areas are sometimes noticed. The spots are painful on pressure and for that reason sexual intercourse, or even the introduction of a douche-nozzle, may be very painful. As the disease progresses, the older portions lose their color and elasticity. The hyperemia disappears and, instead, the tissue becomes white and dry and brittle and cracks easily (Fig. 217).

Another marked characteristic is the tendency to shrink. The atrophic contraction may progress to such an extent that the vaginal opening is much narrowed (Fig. 217). Microscopic examination of the excised tissue shows that the process is essentially a chronic inflammatory atrophy or cirrhosis of the skin. In the new areas, there is serous and cellular exudate, with hyperaemia and occasionally slight hemorrhage. In this stage there may be decided thickening of the affected spots. Later, the cellular exudate becomes organized, with resulting contraction and hardening and atrophy. The glandular structures (sweat glands, sebaceous glands and hair follicles) are slowly obliterated by pressure-atrophy, and there is left simply cirrhotic tissue.

The patholgical changes just described are usually accompanied by burning and itching and tenderness. Owing to the sensitive spots and the narrowing of the vaginal orifice, coitus may be painful or impossible. Owing to the brittleness of the tissues, the examination may cause fissures, which add to the patient's discomfort. This affection is one of the causes of persistent and severe pruritis vulvae.

In some cases, but little discomfort seems to result from the pathological changes, The disease is gradually progressive for a number of years but is not self-limited and spontaneous cure can not be promised, though in the areas in which the skin structures are practically destroyed, the pain and itching may be much diminished.

Treatment. Temporary relief may be afforded by the measures given under Pruritis Vulvae. One case was much benefitted, in fact temporarily cured, by the use of the sharp curette followed by the long continued application of a 3% solution of salicylic acid in alcohol.

One writer recommends that an ointment containing one to three per cent. of yellow oxide of mercury, be rubbed well into the parts by the patient twice daily, and that twice weekly the physician introduce the speculum, cleanse the vulva and vagina with a spray of hydrogen peroxide and then apply the above ointment to all the affected surfaces.

In these cases, the X-ray treatment, by a competent person, sometimes gives great relief after other measures have failed, and if continued may affect a cure.

Permanent relief in many cases may be afforded by extirpation of the involved tissue, and this operation should be carried out when the symptoms are severe and not relieved by other measures. Excision of the affected tissue should not, however, be carried out until the disease has existed some time and its probable limits can be defined. If in the early stage the parts then affected are excised, there is strong probability of the development of the same process in remaining tissues, necessitating a second operation. When an operation is decided upon, the incision should include all the superficial areas involved and should be deep enough to include part of the subcutaneous tissue.

The resulting wound should be closed as far as possible by sutures (Fig. 485-B). When the margins of the wound can not be brought together, the uncovered portion, if small, may be left to granulate. If the uncovered portion is large, immediate skin-grafting may be done at the time of the operation.

The results of extirpation are encouraging. Decided relief is afforded and in some cases there is a complete cure. Some of the skin surface, unaffected at the time of the operation, may show evidences of the disease later, with symptoms requiring treatment. If the symptoms are severe and persistent, those portions of skin may also be excised. This may not, however, be necessary and other methods for relieving the pruritis should be given a thorough trial.

PRURITIS VULVAE.

Pruritis vulvae signifies simply itching about the external genitals, but by common usage the term has come to be restricted to those cases in which the itching and burning is marked and persistent.

Etiology and Pathology. The general nervous disturbances and the local atrophic changes that accompany and follow the menopause, predispose to pruritis vulvae, hence the vast majority of cases are found in that period of life.

The following are the exciting causes:

1. An Irritating Vaginal Discharge. The discharge may originate in the vagina or in the uterus. Adhesive vaginitis, which occurs principally in the aged, is a frequent cause of pruritis vulvae. Sometimes a discharge which is so slight as not to be noticed by the patient, will keep up a troublesome pruritis, the pruritis disappearing temporarily when the discharge is kept from irritating the external genitals by the administration of douches or by a tampon against the cervix.

2. Irritating urine, for example diabetic urine, highly-acid urine and pus-bearing urine due to inflammation of the bladder or kidney.

3. Parasitic affections, of which the most common in this region is pediculosis pubis. In children thread-worms from the rectum may cause persistent itching.

4. Skin diseases, such as eczema, follicular inflammation and prurigo.

5. Lack of cleanliness.

6. Growth of short bristly hairs on the inner surface of the labia. These scratch and irritate the adjacent surfaces and sometimes cause very troublesome pruritis. Occasionally such irritation is caused by the short hairs present for some weeks after shaving the parts for an operation.

7. Friction from exercise, especially in very stout persons.

8. Kraurosis vulvae, or as it is sometimes called "local nerve fibrosis." J. C. Webster carefully studied the microscopic characteristics of excised tissue in several cases of pruritis vulvae, and found a progressive nerve fibrosis, affecting principally the nerves of the clitoris and labia minora. It affected both the nerves proper and the nerve endings. It was apparently distinct from the cellular infiltration of the subepithelial tissues caused by scratching.

9. Chronic congestion, from diseases of the uterus or tubes or ovaries or other pelvic structures.

10. Functional nervous disturbance. In some cases, no cause for the disturbance can be found and apparently no local changes are present, aside from the abrasions and irritation caused by the scratching. Under such circumstances the disease is classed as a "neurosis."

In some cases the gouty diathesis is apparently responsible for the trouble. The presence in the blood of urea, sugar, bile, or other products of faulty metabolism have a general irritating effect on the vulvar and vaginal surfaces. Alcoholic drinks, rich foods and, in certain persons, fish or shell-fish, may assist in causing the disease.

Symptoms. The patient complains of an intense itching about the genitals. It may be confined to the clitoris, labia or vestibule, or it may involve all these structures and also adjacent regions, for example, the vagina, anus and inner sides of the thighs. The itching and burning may be practically continuous, but more often it is intermittent in character. It may disappear spontaneously for several hours or days or even longer, only to return as suddenly as it disappeared. Congestion at the menstrual period or during pregnancy increases the pruritis. Irritating articles of food and also alcoholics often have the same effect. The warmth of the bed usually makes the itching worse, consequently the patient may lose much sleep. During sexual intercourse the itching and burning are much increased.

Frequently the distressing symptoms persist in spite of local and general sedatives and in some cases they become intolerable, making the patient's life a burden to her. On account of the irresistible tendency to scratch or rub the parts, the skin becomes irritated and abraded and inflamed. Deep fissures may form and in some cases a discharging or weeping surface develops, to be followed by scar tissue. The constant suffering makes the patient irritable and nervous and in some cases leads eventually to nervous prostration.

Treatment. The treatment for pruritis vulvae may be presented in the following steps:

1. Remove All Local Causes of Irritation. These have been enumerated under etiology. If an irritating vaginal discharge is present it must be stopped by appropriate treatment of the disease causing it. If that is not possible, the discharge may be kept from irritating the genitals by washing it away with antiseptic douches. Sometimes it is advisable, after the douche, to introduce a tampon which prevents the discharge from coming in contact with the external genitals. The tampon is removed at the next douche time. The tampon may be used dry or it may be saturated with borax and glycerine (1 to 4) or with acetate of lead and glycerine (1 to 4) or with ichthyol-glycerine (10% to 25%). The importance of vaginal discharge as a causative factor in pruritis is not so great as might at first be supposed. In fact, it is very doubtful if ordinary leucorrhoeal discharge alone ever causes severe pruritis. In each case there is probably some other more important factor. In a case of pruritis presenting a vaginal discharge, the discharge has some effect in keeping up the local irritation and consequently should be stopped. But there is no certainty that the pruritis will cease when the discharge is stopped, hence caution in prognosis is necessary. Other causes of local irritation, such as diabetes, local skin diseases and uterine or ovarian disease causing pelvic congestion, must receive appropriate treatment.

2. Attend to the general health. Regulate the bowels so that the accompanying pelvic congestion is diminished. Also, put the patient in the best general health, that the condition of the nervous system may be improved accordingly.

General sedatives, for example, bromides, valerian, hyoscyamus, may diminish the itching by their effect on the nervous system. The anti-neuralgic remedies (phenacetin, antipyrin, phenalgin) may give temporary relief.

Uric acid diathesis, neurasthenia, gastro-intestinal disturbance and other diseases present must receive appropriate treatment. The diet must be looked after sufficiently to exclude alcoholics and other articles that tend to prolong skin irritation.

In some cases it may be necessary to make a complete change of climate and surroundings, in order to satisfactorily affect the patient's nervous system or some existing diathesis.

3. EMPLOY LOCAL SEDATIVE APPLICATIONS to relieve the inflammation and check the local nerve irritation.

The various applications given under vulvitis and other forms of vulvar irritation may be tried. The silver preparations (silver nitrate, argyrol, protargol) are particularly effective, when there is active superficial inflammation. If follicular inflammation is present, the inflamed follicles may be emptied by puncture and the small cavities touched with silver nitrate solution (10%) or even with the silver nitrate stick. The thorough applications of silver nitrate solution (10%) or protargol (10%) sometimes gives decided relief from pruritis even when no inflammation is present.

A useful mixture for washing out the vagina and for an external wash in these cases is the lead and opium and carbolic acid mixture (see Formulæ). Cold applications, such as an ice-bag or cloths wet in ice water, sometimes give relief. Warm sitz-baths of plain water, taken two to four times daily, aid in keeping the parts clean and also tend to relieve the local inflammation and irritation. Instead of plain water the vaginal wash just mentioned may be used in the sitz-bath. In some cases the addition of ordinary bran seems to increase the soothing effect of the sitz-bath. The patient may remain in the sitz-bath from 10 to 30 minutes, the fluid being occasionally injected into the vagina if there is much internal irritation.

Most cases require additional applications which are more strongly sedative or anesthetic or stimulating, as the case may be.

Skene recommends the following, each of which has been used with benefit. Bichloride in almond oil (see Formulae), morphine and chalk powder (see Formulæ), opium and aconite mixture (see Formulæ). Of these preparations, the bichloride in almond oil proved beneficial in the largest number of cases. When this fails, iodoform in ether (1 to 4) or carbolic acid and tincture of iodine (equal parts) may be applied by the physician.

The iodoform in ether is applied by means of an atomizer. By using strong air pressure the solution is forced into all the folds of the epidermis or mucous membrane. The ether evaporates, leaving a fine coating of iodoform over the whole surface. This nearly always relieves considerably and, if applied frequently, is curative in some cases. The carbolic and iodine mixture is applied thoroughly to all the involved surface by means of a camels hair brush or a small piece of cotton on an applicator. This is very effective in relieving the pruritis, but is liable to cause considerable local irritation and dermatitis. It should not be reapplied until the irritation from the first application has subsided.

Skene gives an account of one case of severe pruritis in which he used the carbolic and iodine mixture with the ordinary method of application, as given above, but found it difficult to get the medicine into all the irregularities. Consequently, he applied it by means of the atomizer, using high pressure. The first effect was a sharp pain followed by numbness of the parts and relief from the itching. Later, there was great irritation and pain, and the superficial layers of the skin and mucous membrane came off, as though they had been blistered. The patient stated, however, that even when the pain from the irritation was at its height, it caused far less suffering than the previous itching. When the patient recovered from the treatment, the itching did not return for several weeks and then only in slight degree. The same application was again made to several spots that were itching, care being taken not to cover more than a small area. The result of the two applications was a complete recovery from the intolerable pruritis.

In irritation from diabetic urine, bismuth subnitrate, either alone or mixed with an equal quantity of prepared chalk, is an excellent application. Direct the patient to prevent, as far as possible, the urine from running over the parts, and immediately after urination to wash the parts with a carbolic wash and then dry carefully and then dust on the powder freely.

Ravogli recommends the following additional measures in vulvar irritation from various causes:

A carbolic and sulphur ointment (see Formulæ) when the irritation is due to diabetic urine. For the same purpose a liniment of oil and lime water, with 2% to 4% ichthyol added, is recommended, to be applied when the patient can remain in bed. When the patient cannot remain in bed, some protective ointment such as benzoated oxide of zinc ointment or the zinc and subcarbonate of bismuth ointment (see Formulæ) may be used.

When eczema is present, direct the patient to irrigate the vagina with a 5% solution of borax twice daily. Every other day insert into the vagina a tampon saturated in a mixture of 25% ichthyol in glycerine, the tampon to be left in the vagina twelve hours. To relieve the itching and sterilize the skin apply the carbolic and alcohol mixture (see Formulæ). This causes some burning at first but soon affords relief. After this application direct the patient to apply pieces of lint saturated with the ichthyol and almond oil liniment (see Formulæ). When the itching has disappeared and the eczema is nearly well, the ichthyol liniment may be discontinued and the zinc and bismuth ointment (see Formulæ) used. After the eczema has disappeared, the parts should be frequently cleansed with a carbolic solution and dusted freely with some drying powder.

When there is persistent follicular inflammation, the carboic and bismuth and mercury ointment (see Formulæ) is useful. Ichthyol is also highly recommended either as the liniment (see Formulae) or in the form of a salve (10%) in association with the zinc ointment and 2% beta-naphthol. Ointments containing sulphur also are recommended, such as Lassar's paste (see Formulæ). The result of treatment for pruritis vulvae is very uncertain and measures that are efficient in one case may fail completely in another. I have obtained good results from an ointment of chloretone (10%). Much relief may be afforded also by orthoform

ent (10%) and by cocaine ointment (1% to 10%). Electricity has given

ome cases, and it is well to try it in a variety of applications.

The X-ray treatment, when available, should be given a thorough trial in severe pruritis cases, before resorting to operative measures.

4. OPERATIONS. In certain intractable cases, particularly those accompanied by evidences of kraurosis vulvae, relief was afforded by excision of the involved tissues as previously described, after the other measures had failed. When incision is resorted to, it is as a rule necessary to remove the labia minora and the clitoris with its prepuce, and often the inner portions of the labia majora.

Another operative measure which has brought about recovery in some cases, is resection of the internal pudic nerve. The nerve is reached by an antero-posterior incision midway between the tuberosity of the ischium and the anus. Care must be taken that the innervation of the rectum be not damaged, with resulting incontinence of feces.

HYPERESTHESIA OF THE VAGINAL ENTRANCE.

The structures surrounding the vaginal orifice may be so hyperesthetic, that coitus is very painful and in some cases impossible. Occasionally the parts are so tender and the nervous irritability so marked that attempts at sexual intercourse cause a spasm of the muscles surrounding the vaginal opening, including the levator ani. This spasmodic condition is known as "vaginismus."

Causes. Hyperesthesia of the vaginal entrance occurs most frequently in nervous young women, newly married, or in women near the menopause. The causes of this marked hyper-sensitiveness are as follows:

a. Urethral caruncle or inflammation about the meatus.

b. Painful fissures about the vaginal orifice or about the anus.

c. Inflammation of a rigid hymen or of remnants of a hymen.

d. Abnormal form of vulva by which the penis is directed in the wrong direction, particularly against the urethra, causing much pain.

e. Neuromata on remnants of the hymen.

f. Neuroses. In some cases, especially in women near the menopause, no local cause for the marked sensitiveness can be discovered and it is apparently due to some functional disturbance of the nerves.

Treatment. The treatment may be presented in the following steps:

1. Reduce the general nervous irritability by sedatives and relieve the pelvic congestion by laxatives.

2. Remove all local lesions that cause irritation. Abrasions, fissures and areas of inflammation must be made to heal. The various therapeutic measures for these conditions have been described. A rigid hymen must be treated by stretching or incision or excision.

Neuromata sometimes develop in remnants of the hymen about the posterior commissure, and occasionally in the tissues about the meatus or the clitoris. There may be one or more nodules, varying in size from the head of a pin to a bean. They are exceedingly sensitive when touched in the examination. They should be excised deeply and the small wound closed by one or two sutures if there is much bleeding. Ten to twenty drops of cocaine solution ($\frac{1}{2}\%$) injected under the nodule a few minutes before excision diminishes the pain. If the nodule can be easily raised it may be clipped off with the scissors. If it is imbedded in the tissues it must be dissected out with a knife.

3. Employ local sedative applications. A hot carbolic douche, once or twice daily, may diminish the sensitiveness of the parts. The various sedative measures mentioned under vulvitis and pruritis vulvae may be employed. The 10% chloretone ointment may give much relief. A cocaine suppository (see Formulæ) introduced into the vagina a few minutes before may diminish or remove the pain of coitus. A cocaine ointment (5%) may be applied to the sensitive parts with the same effect. The ointment applied freely serves also to lubricate the parts and in that way helps to diminish the pain.

When this affection occurs in a young married woman, if the pateint becomes pregnant and is delivered at term, the vaginismus will probably be heard of no more. Consequently, if by temporary measures the pain of sexual intercourse can be overcome for a few weeks, pregnancy may take place and a permanent cure follow.

In some mild cases the patient may be given relief or even cured by introducing a bivalve speculum every second or third day, and very slowly and carefully stretching the parts until decided discomfort is noticed. No severe pain should be caused, as the patient may be frightened and made worse. After the gentle stretching, a small tampon, with the upper end soaked in boro-glyceride, should be placed in the upper part of the vagina. This tampon should be small at first but as new ones are placed they may be gradually increased in size until the vagina is firmly filled, but the tampon must not come low enough to make troublesome pressure on the vaginal entrance.

4. Forcible dilatation. When the milder measures fail to give relief the patient should be anesthetized and the vaginal entrance forcibly stretched with the fingers or with a bivalve speculum. The speculum is introduced and opened and then withdrawn while the blades are widely separated. Any abrasions remaining after the stretching should be touched with carbolic acid and an antiseptic dressing, of absorbent cotton or gauze, should be kept over the vulva until all the abrasions have healed. After the stretching, a vaginal plug of glass is introduced every day for a time to prevent contraction of the healing tissues.

When forcibly stretching the vaginal orifice, if there are fibers that do not yield readily they may be divided subcutaneously with a bistoury. In some cases in which the opening is narrow and the perineum rigid, it is advisable to employ the method devised by Sims, namely, excision of a V-shaped piece of tissue at the posterior margin of the vaginal opening. This gives a result corresponding to slight laceration of the perineum in labor and is of much benefit. It gives a larger vaginal opening but does not interfere to any extent with the integrity of the pelvic floor. In those cases in which the hyperesthesia is due to abrasions, principally in young women, this forcible stretching is very effctive.

In the purely neurotic cases, chiefly in women near the menopause, it may produce but little result. Such cases are exceedingly rebellious and occasionally persist in spite of all treatment. Complete excision of the skin covering all hyperesthetic areas, gives temporary relief, but the trouble may return after a few months.

In the intractable cases, the treatment that promises most relief is excision of the skin over the affected areas and then, or as soon as the parts have healed sufficiently, send the patient away from home to where there will be an enjoyable change of air and scenery and environment. Advise regular and moderate exercise and a nourishing but unstimulating diet. Forbid excessive exercise and forbid sexual intercourse or sexual excitement. Regulate the bowels, give tonics and allay the local disturbance temporarily by the cleansing and sedative measures previously described. Resection of the internal pudic nerve may give relief in an intractable case.

ADHESIONS OF PREPUCE.

Not infrequently in infants adhesions are found between the glans of the clitoris and the prepuce. In some cases the adhesions are extensive (Fig. 223) and much irritation is produced by retained secretion. In such a case the adhesions should be separated. A strong solution of cocaine (10% to 20%) is applied to the parts for five minutes, then with a blunt dissector, the adhesions are broken, the glans thoroughly exposed (Fig. 224) and the part cleansed and smeared with carbolized zinc ointment (2%) or with carbolized vaseline (2%). Every day or two the prepuce should be pushed back and the antiseptic ointment applied, until there is no further danger of the formation of new adhesions.

ADHESIONS OF LABIA.

The labia minora are occasionally found adherent. This condition may be congenital or acquired. In the latter case, the cause is inflammation or ulceration of various kinds, producing raw surfaces which come in contact and grow together (Fig. 225). The adhesions are usualy found in the unmarried, as the parts are not so frequently disturbed, and especially in children and in the aged, when considerable irritation may persist without attracting notice. The adhesions between the labia are easily broken if recent, but later the adherent surfaces become firmly united by connective tissue and can be separated only with the knife. The treatment, when the adhesions are recent and weak, is to break them with a probe or other blunt instrument, separate the labia and keep them apart with pledgets of cotton. Treat the affected surfaces as indicated by the inflammation or ulceration present. When the adhesions are old and firm, the parts may be separated with the knife or scissors or the line of union, with some of the thickened tissue on each side, may be excised, sutures being then introduced to check the hemorrhage and close the raw furfaces. If there is a marked tendency of the vaginal orifice to contract from scar-tissue, it may be stretched at the same time, and a glass plug worn for a time afterward if necessary.

CHAPTER V.

LACERATION AND FISTULÆ

of the Pelvic Floor, Perineum, External Genitals and Vagina.

POINTS IN ANATOMY.

The term "pelvic floor" is applied to that group of structures which closes in the pelvic outlet and supports the structures above it. The muscular and fascial layers are shown in Fig. 487. The important structures—those that give strength to the floor—are principally the levator ani muscles and the recto-vesical fascia. There are, however, a number of other stuctures in this locality, and probably the best way to consider them systematically is to take them up in the order in which they are met with in the regular dissection of this region.

Having the body in position for dissection of the perineum and making observation before the integument is removed, it is found that the area between the coccyx and the pubes is filled in as follows, beginning in front:

The vulva or external genitals.
The perineum.
The anus and the ischio-rectal fossa of each side (covered with integument).

The vulva and perineum occupy the anterior half of the space. The anus is situated at about the center, and around it to the sides and behind, are the ischio-rectal fossae.

The **external genitals** have been described in chapter IV. The **perineum** is the wedge of tissue situated between the vagina and the lower portion of the rectum. Seen in the antero-posterior section, it is roughly triangular (Figs. 1, 3, 593). In some cases it is somewhat quadrilateral. It separates the vaginal opening from the rectal opening, but does not form an essential part of the the real supporting floor of the pelvis.

The removal of the skin and superficial fat and fascia, exposes the perineal fascia the sphincter ani muscle and the ischio-rectal fossa of each side. Each ischio-rectal fossa is bordered behind and at the outer side by the gluteus maximus muscle.

Reflecting the perineal fascia there are exposed, the sphincter vaginae and the transversus perinei muscles (Fig. 488). The transversus perinei muscle of each side is a small muscular band which arises from the ischial tuberosity and, extending inward, joins at the center of the perineum with the muscle of the opposite side and with the sphincter vaginae and with the sphincter ani muscles. When the perineum is torn, the action of all these muscles, particularly of the transverse muscles, is to draw the torn surfaces outward and keep them apart.

When all the superficial tissues, including the clitoris and the crura, are cleared away, then there is exposed the real pelvic floor—the supporting structures. These structures are, the **levator ani muscles,** one on each side (Fig. 489) called also the levator ani et vaginae, and the **fascia** above and below them (Figs. 490, 491). The fascia under the muscle is thin and is called the "levator fascia," while the strong fascia above the muscle is called the "recto-vesical" (Fig. 490). The levator ani muscles, arising from each side of the pelvis and joining in the median line, form a sling which holds up the vagina and rectum and at the same time holds their lower ends forward under the pubic arch.

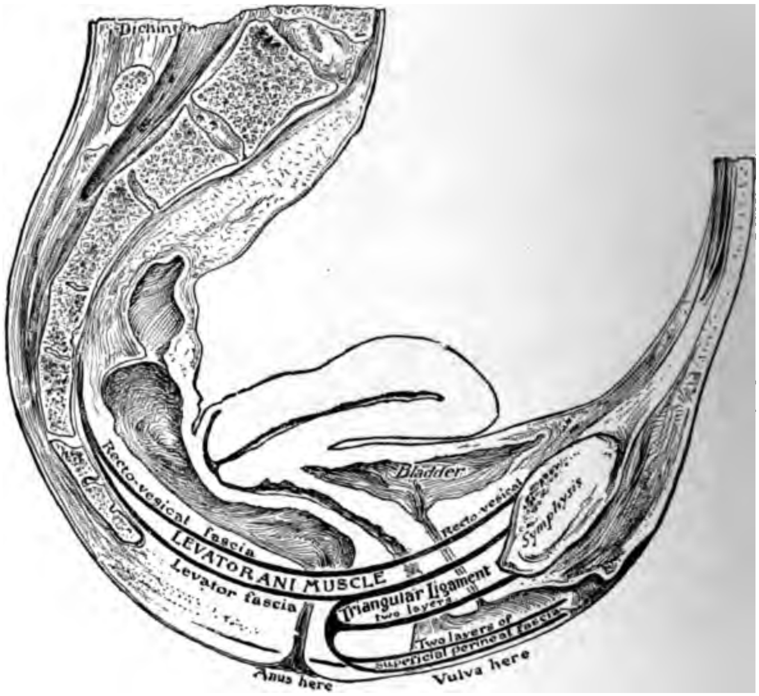


Fig. 487. A diagrammatic representation of an antero-posterior section of the pelvis, showing the various Fascial Layers of the Pelvic floor. (Dickinson—*American Text-book of Obstetrics.*)

Each levator ani muscle arises in front from the posterior surface of the pubic bone, behind from the spine of the ischium and between these points from the "white line" (Fig. 87) that marks the division of the pelvic fascia. The anterior portion of the muscle passes downward and toward the median line and unites with a corresponding portion of the muscle of the opposite side. Some of the fibers unite with the lower part of the vagina, some with the lower part of the rectum, some between the vagina and rectum and many of them back of the rectum. The most posterior fibers of the muscle unite with the coccyx. Lying back

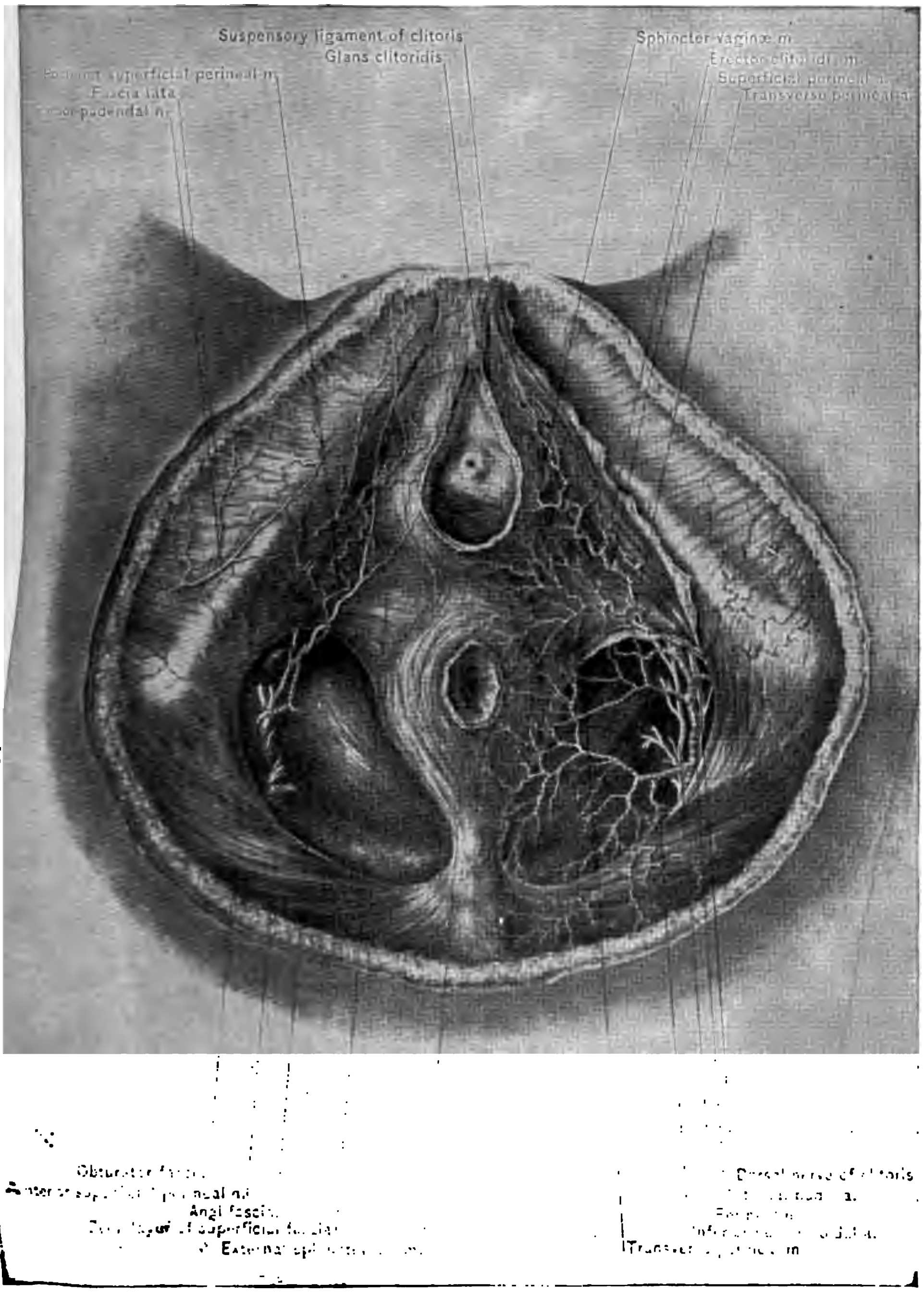


Fig. 488. View of the superficial structures from below. Showing the Sphincter Ani Muscle, the Transversus Perinei Muscles and the Arteries and Nerves. (Deaver—*Surgical Anatomy*.)

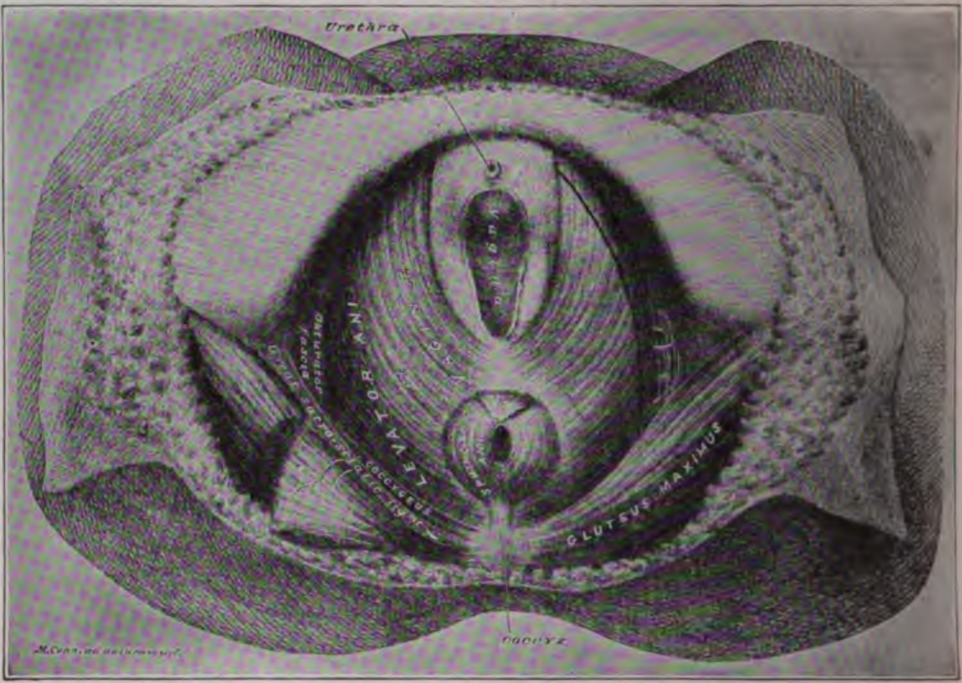


Fig. 489. The superficial structures removed, exposing the Levator Ani et Vaginae Muscles. (Savage-*Anatomy of Female Pelvic Organs.*)

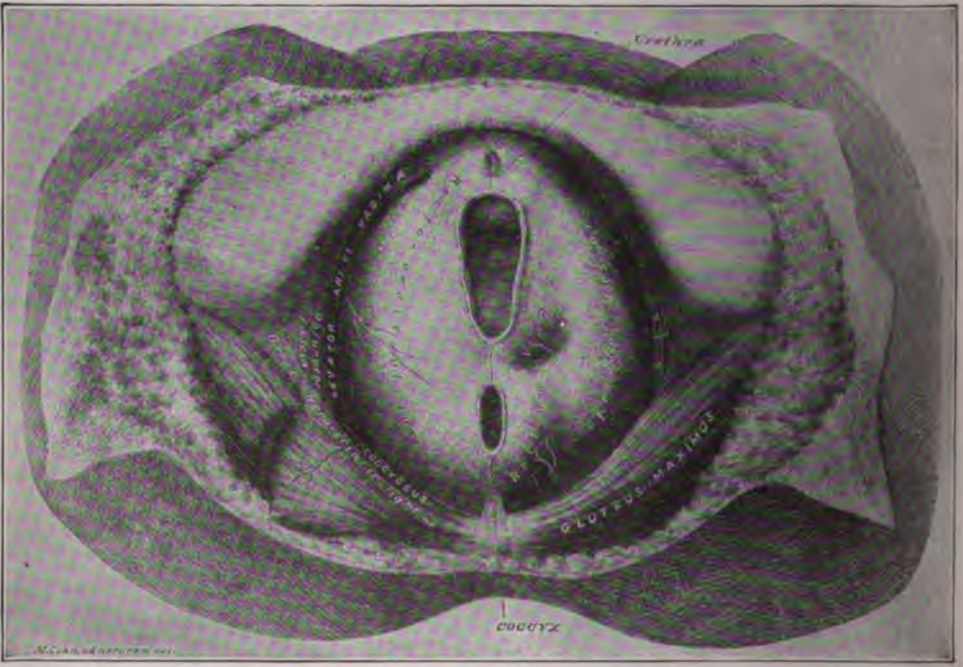


Fig. 490. The Levator Ani Muscles removed, exposing the strong Recto-vesical Fascia. (Savage—*Anatomy of Female Pelvic Organs.*)

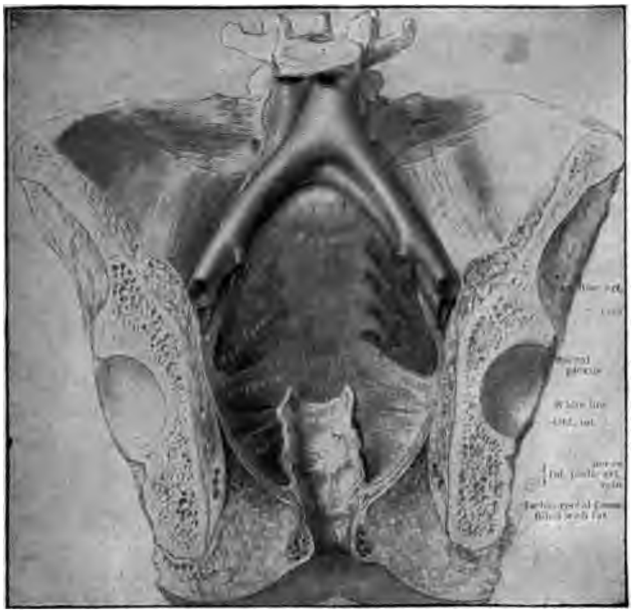


Fig. 491. The Pelvic Sling. It is composed of the Levator Ani Muscles and the Fascia above and below them. Its attachment to the rectum is here shown but the vagina is not shown. (Kelly—*Operative Gynecology.*)

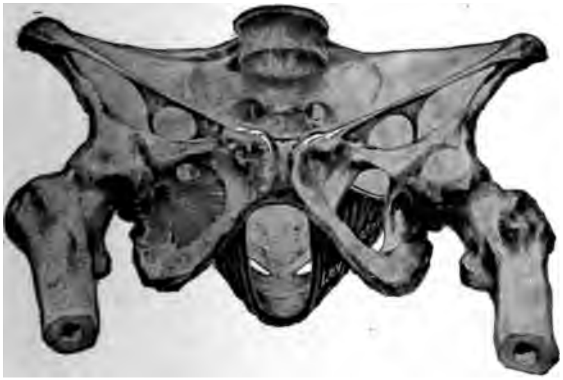


Fig. 492. The Pelvic Sling, formed by the Levator Ani **Muscles.** (Dickinson—*American Text-book of Obstetrics.*)

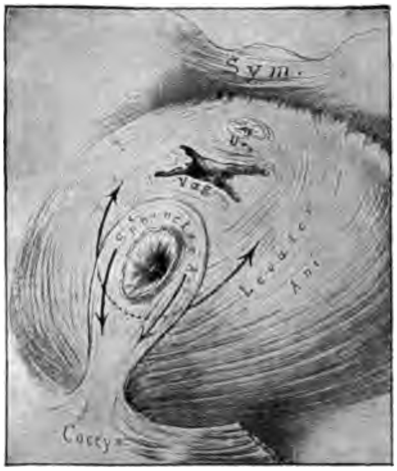


Fig. 493. Actions of the Pelvic Sling. It tends to draw the vaginal opening and the anus forward under the pubic arch, at the same time that it supports them. (Kelly—*Operative Gynecology.*)

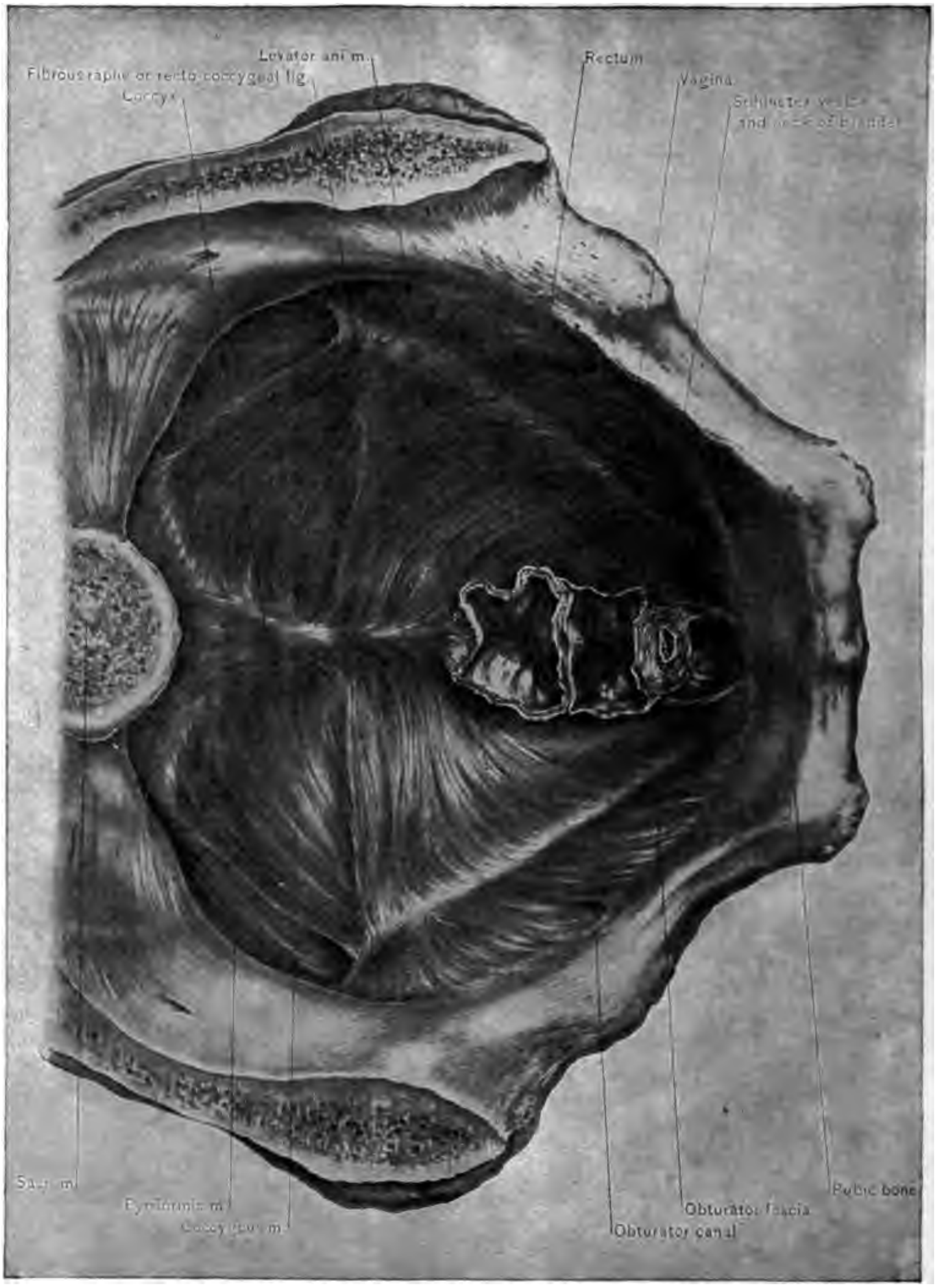


Fig. 494. The Pelvic Sling, from above. The observer is supposed to be standing at the right side of the cadaver and looking into the pelvis. The pelvic contents have been removed in order to show the pelvic floor. (Deaver—*Surgical Anatomy*.)

of the posterior part of the levator ani muscle is the coccygeus muscle. The action of the levator muscles, in conjunction with the fascia above and below them, is to hold forward the lower end of the rectum and vagina close to the symphysis pubis, and at the same time to form a sling which closes the pelvic outlet and supports the organs above (Figs. 491, 492, 493, 494). Waldeyer has given this the very appropriate designation of "diaphragm of the pelvis."

When the muscles and fasciae are torn, the effect is two-fold:

1. The sling is lengthened and does not furnish the suppport it previously did.
2. The vaginal and rectal openings (the weak places in the pelvic floor) are allowed to sink backward into the line of pressure, so that the weight from above, which formerly fell on the muscle and fascia, now falls on the openings.

In repairing the pelvic floor, the following two things must be accomplished:

1. The pelvic sling must be shortened, so that the slack is taken up.
2. The vaginal opening must be brought forward under the pubic arch, out of the line of direct pressure.

LACERATION OF PELVIC FLOOR AND PERINEUM.

Laceration of the pelvic floor is laceration of the supporting structures at the pelvic outlet, principally the levator ani muscles and the fascia immediately above and below them. This is usually accompanied by laceration of the vaginal wall. **Laceration of the perineum** is laceration of the wedge of tissue placed between the lower portion of the vagina and the rectum. This is usually accompanied by laceration of the fourchette and of the lower part of the vaginal wall.

In nearly all the important injuries at the pelvic outlet, the laceration involves both the pelvic floor and the perineum, consequently it is most convenient to consider these two lesions together under the term that heads this subject. As the injury of the pelvic floor is the more important lesion, the perineal tear being in most cases of secondary importance, the injury is frequently spoken of simply as laceration of the pelvic floor. It is known also as "relaxation of the pelvic floor" and as "relaxation of the pelvic outlet."

ETIOLOGY.

The usual cause of laceration of the pelvic floor and perineum is **child-birth.** As the child's head passes through the pelvic outlet, the structures are greatly stretched and, if it is the first baby, there is frequently more or less laceration. In many cases the laceration is so slight as to be hardly noticeable. In some cases it is moderate and will cause trouble later if not repaired. In a few cases it is very severe, extending deeply into the sides of the pelvis or into the rectum or into both regions.

PATHOLOGY AND DIAGNOSIS.

To understand the pathology of this affection, certain points in anatomy must be kept in mind. The real pelvic floor, that is the part that supports the organs above is formed by the two levator ani muscles with the layer of fascia immediately above and below (Figs. 487, 491, 492, 493). The recto-vesical fascia is a strong fibrous layer, probably the strongest and most resistant single element in the pelvic floor. It evidently is the structure which furnishes continuous support to the organs above, for the muscles of the floor can not be constantly tense.

The perineum takes little part in the formation of the pelvic flooor, as it lies below and outside of the supporting sling. The perineum may be torn with practically no damage to the pelvic floor, providing the anterior part of the levator ani muscles or adjacent fasciae are not involved in the tear. It is not the tearing of the perineum that destroys the integrity of the pelvic floor, but the tearing and stretching of the musculo-fibrous sling which passes back of the rectum and holds both the rectum and vagina well up under the symphysis (Fig. 493).

The pathological changes and the diagnostic points are best considered together under the different varieties of laceration. Immediately after the delivery of the child and placenta, search should be made for tears of the perineum and pelvic floor.

Varieties of Laceration.

There are several varieties of laceration, differing in extent and location.

1. There may be a slight tear of the perineum only, involving less than half of the perineum. The fourchette is torn and also part of the skin covering the perineum and also the lower portion of the posterior vaginal wall. Such a tear has practically no effect on the pelvic floor, as the pelvic floor proper is not involved. It is called a laceration of the perineum of the "first degree."

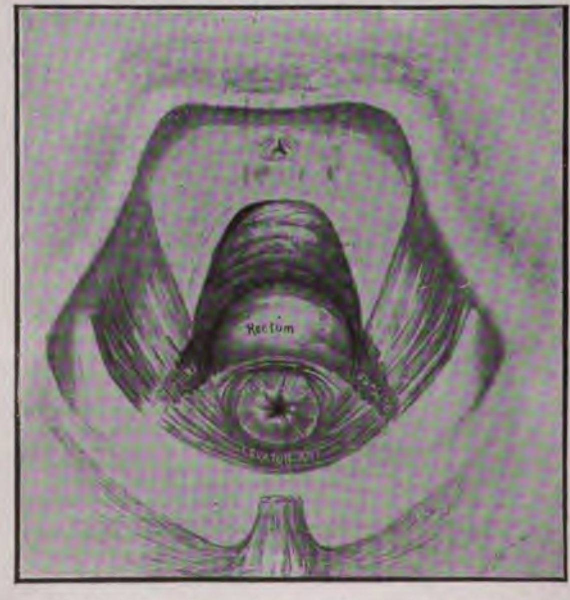


Fig. 495. A Deep Laceration, extending up each vaginal sulcus and involving the Pelvic Sling on each side (Gilliam—*Practical Gynecology*.)

2. There may be a teardown past the middle of the perineum—laceration of "second degree." This may involve the perineum only, in which case there is no decided damage to the pelvic floor. Usually, however, the tear extends up the vaginal sulcus of one or both sides and involves the front part of the levator ani muscle and recto-vesical fascia (Fig. 495). The lacerations involving the mus-

cular and fibrous structures at the sides of the vagina are sometimes spoken of as "lateral" or "transverse" lacerations. The laceration of the muscle and fascia may be open, communicating with a vaginal tear, or subcutaneous, with no vaginal tear in the immediate vicinity. By washing the blood out of the vagina with a hot douche and exploring with the finger, the tear in the vaginal wall may be felt and traced to its full extent. When its extent can not be satisfactorily made out with the fingers alone, the vagina may be held open with retractors and the length of the tear ascertained by inspection. The tear may, in exceptional cases, extend around the sphincter ani, on one or both sides, without extending through that muscle into the rectum.

3. There may be a tear of the perineum through the sphincter ani muscle into the rectum—laceration of the "third degree" (Fig. 496). This of course occurs only in exceptional cases and is usually accompanied by one or more deep tears of the pelvic floor.

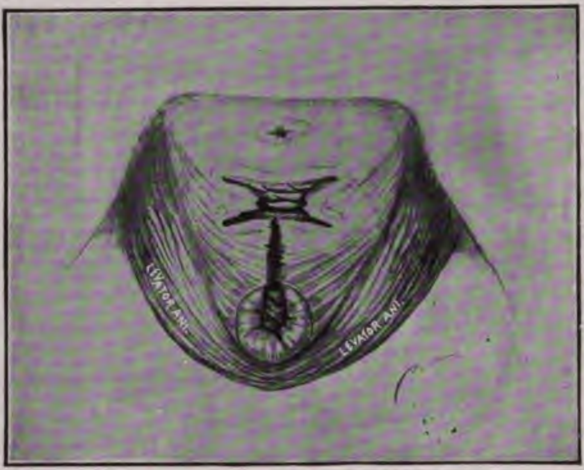


Fig. 496. A Laceration extending directly through the Sphincter Ani muscle and other structures between the vagina and rectum. The Levator Ani muscles are not involved. (Gilliam—*Practical Gynecology*.)

4. The perineum may be torn only slightly externally, while there is a deep tear inside involving the vaginal wall and the deeper structures. Such a tear may be overlooked unless careful exploration is made after labor.

5. The vaginal wall and perineum may be torn, the rim of the vaginal orifice remaining intact. This is known as central rupture of the perineum (Fig. 235). It is very unusual.

The five varieties of laceration just given are easily recognized at the close of labor and should be repaired at once.

6. In some cases the pelvic sling is seriously damaged without any open tear of the perineum or vaginal wall. In such a case there is no open wound to be seen or felt. In fact, in such a case it is difficult or impossible to make a positive diagnosis of laceration at the time, because of the marked stretching and distortion of the parts that normally takes place and is followed by no trouble. In such a case, the individual tears in the muscles are probably small and numerous. The diagnosis is made later, when it is found that the pelvic floor is weak and does not furnish proper support. Such cases are, by some writers, designated as "relaxation of the pelvic floor." But I see no reason why the term "relaxation" should be applied to this form of tear any more than to the open tear. Of course, a condition

of relaxation is found after all severe injuries of the pelvic floor, but that simply means that there has been a tear, either open or subcutaneous, and the condition should be considered under the head of laceration.

Skene mentions having seen three cases of such subcutaneous injury in which the sphincter ani was also torn. Each patient had incontinence of feces, and yet the most careful examination failed to show any evidence of an open tear, either over the perineum or in the vagina.

Results of the Laceration.

In laceration of the pelvic floor, not repaired at once, there is decided increase in the chance of infection following labor. If the patient escapes sepsis, there is not much discomfort until she gets up and about, for as long as she is lying in bed the loss of support at the pelvic outlet is but little noticed. Of course, if the tear has extended into the rectum there is incontinence of feces.

After the patient has been up and about the house for a short time, she notices decided weakness in the pelvis, which becomes more marked as she becomes otherwise stronger and attempts more work. She complains of a dragging weight in the pelvis and of back-ache. As the uterus sinks in the pelvis, the cervix frequently goes forward, as well as downward, and the fundus goes backward in retroversion. This tendency of the cervix to sink downward and forward is increased by the inflammation and subinvolution resulting from cervical lacerations, received in the same labor.

On inspection, it is found that, instead of a normal vaginal opening, the vaginal outlet is relaxed—that is, it is open and without tone or resistance. The two index fingers introduced into the opening (Fig. 59) may be carried to the sides of the pubic arch with but little resistance. If now the patient be directed to bear down or strain, as in defecation, the sinking and protrusion of the parts become more marked, and the relaxation of the floor is more apparent. Another method of testing the relaxation of the floor is shown in Figs. 57 and 58. The margin of the untorn portion of the pelvic sling may often be felt on one or both sides in the vagina some distance from the vaginal orifice.

Though in most cases of laceration, the vaginal orifice is widened and patulous and the remaining perineum very narrow, in some cases the skin surface of the perineum is intact and the vaginal orifice is small and placed at the normal distance from the anus. A superficial examination of such a patient would lead to the conclusion that the pelvic floor was intact, but examination within the vagina (Fig. 57) shows marked relaxation, establishing the fact of serious laceration of the pelvic sling.

Subinvolution of the vagina with more or less atrophy of the pelvic muscles, results from unrepaired laceration of the pelvic floor.

Effects of the Loss of Support.

The cervix sinks into the pelvis and comes forward and the fundus uteri frequently goes backward into **retrodisplacement** (Fig. 343). Also, the whole uterus lies too low in the pelvis, constituting **prolapse** of the uterus (Fig. 287).

As the damaged pelvic floor and other supports of the uterus gradually stretch more, the uterus may sink so low that the cervix appears at the vaginal opening (Fig. 288). As the uterus sinks lower the vaginal opening enlarges and the vaginal walls roll outward, forming anterior or posterior **colpocele** (Fig. 239).

With the prolapsed posterior vaginal wall, sometimes the anterior wall of the rectum is found, forming a **rectocele** (Figs. 240, 241, 244, 245). An appearance resembling rectocele may be produced by prolapse of a thickened vaginal wall. There is areolar hyperplasia and often considerable venous dilatation, giving quite a large projecting mass, but without displacement of the anterior rectal wall. Whether or not rectocele is really present, is easily ascertained by rectal examination, to determine if the anterior rectal wall is pouched forward with the vaginal wall (Figs. 241, 246, 247). In some cases of rectocele, a large pouch is formed and interferes much with emptying the rectum, it being necessary for the patient to push back the protruding rectocele to secure satisfactory bowel movement (Fig. 245).

If the base of the bladder follows the prolapsing anterior vaginal wall, the condition is known as **cystocele** (Figs. 240, 241, 242). It can be determined by a sound or stiff catheter in the bladder (Fig. 243). Sometimes a supposed cystocele is found to be only vaginal wall. In marked cystocele, a large pouch is formed at the floor of the bladder, in which residual urine remains and decomposes, causing much bladder irritation. It is sometimes necessary for the patient to push back the protruding cystocele before a satisfactory evacuation of the bladder can be secured. Straining at defecation or urination greatly aggravates the cystocele. In some cases both rectocele and cystocele are present (Figs. 240, 241).

When the vaginal entrance is relaxed, air can enter the vagina, and it is sometimes expelled with more or less noise, which is very annoying to the patient. This phenomenon is known as "flatus vaginalis." It is merely a symptom of relaxed vaginal orifice. It was formerly described under the queer title of "garrulity of the vulva."

Laceration of Sphincter Ani Muscle.

If the laceration of the pelvic outlet has extended through the sphincter ani muscle, there will be incontinence of feces and intestinal gases, making the patient miserable and excluding her from society. When completely torn, the sphincter ani retracts—sometimes to such an extent that it scarcely reaches half way around the rectal opening. It may be felt as a thick cord at the posterior part of opening. A slight dimple, or retraction of tissue, frequently marks the location of each end (Fig. 234). A small area of the rectal mucous membrane may be visible as a red inflamed-looking spot, marking the situation of the anus (Figs. 232, 233).

If the sphincter muscle is not completely torn, a few fibers remaining intact, the patient may be able, even from the first, to retain solid feces—that is, there is only partial incontinence. In these cases of partial rupture of the sphincter, and also in cases of complete rupture in which the muscle was paralyzed by the stretching before rupture and the ends of the muscles or tissues close to the muscle lay in contact and became partially united, the patient has control of the bowels except when diarrhoea is present. In some cases the patient has control over feces, both solid and liquid, but there is incontinence of gases.

In some of these cases of partial incontinence, a wide area of scar tissue lies between the ends of the muscle. In such, do not be misled into the belief that there has not been a rupture of the sphincter. The rupture of the muscle is practically complete and the ends must be denuded and united the same as if the patient had no control of the bowels.

A laceration through the sphincter ani muscle and recto-vaginal septum, does not necessarily mean that there has been great damage to the pelvic sling. The principal part of the sling passes back of the rectum, not between it and the vagina (Fig. 493).

If the rectal tear is accompanied by deep lacerations at the sides of the vagina, involving the levator ani muscles, then there will be marked loss of support in the pelvic floor and consequent relaxation of the vaginal outlet. Such accompanying deep lateral lacerations do frequently occur with the result mentioned. But in some cases, the tear in the median line into the rectum seems to have been the only serious damage. In such a case, the incontinence of feces is the only troublesome symptom, there being no evidence of want of support for the pelvic organs.

This essential difference between median and lateral lacerations, explains why it is that some cases of complete perineal laceration with incontinence are not accompanied with the prolapse of the uterus and vaginal walls, so frequently seen in incomplete perineal lacerations. On the old theory that the perineum was the important supporting structure at the pelvic outlet, this class of cases was inexplicable. Since the facts in regard to the anatomy and function of the component parts of the pelvic floor have become known, these cases are easily explained.

Complications.

In old lacerations of the pelvic floor, there are frequently present vaginal discharge, painful menstruation, irregular menstruation, excessive menstruation, attacks of severe pelvic pain, dyspareunia, sterility, abortions, various reflex phenomena and general poor health. These symptoms however are due principally to **associated diseases,** some of which may be traced to the laceration. The diseases which are frequently associated with laceration of the pelvic floor are:

Laceration of cervix.
Chronic endometritis.
Subinvolution.
Retrodisplacement of uterus.
Prolapsus uteri.
Chronic salpingitis.

All lesions present should be found and their severity determined before operative treatment is undertaken.

Treatment.

In a **fresh laceration** of the pelvic floor or perineum in labor, the rule is to repair the injury at once. Even though the tear is not deep enough to damage the pelvic floor, it should be repaired, for every laceration closed lessens to that extent the chance of infection. For the same reason, tears of the anterior vaginal wall or of the vulva should be repaired at once. The details of this immediate repair belong to obstetric work, and need not be considered here.

In an **old laceration** repair of the pelvic floor, months or years after the injury, is a much more tedious operation and requires more preparation and skill. The parts have been stretched out of their normal relations and the contraction of the scar-tissue has drawn mucous membrane over the damaged areas.

Palliative measures. In a case of old laceration, waiting for operation or in which operation is not advisable, considerable temporary relief may be afforded by the knee-chest posture, taken for a few minutes morning and evening. In some cases the patient is made more comfortable by some one of the pessaries useful in retrodisplacement or prolapse (see pages 328 and 340). Vaginal tamponade also gives some temporary relief. Astringent douches, rest in the recumbent posture several times daily, and the various means for reducing pelvic congestion are useful palliative measures.

Operative Treatment. For permanent relief, operation is necessary. Many operative procedures have been designed, the principal ones of which are mentioned below.

Object of the Operation.

The object of the operation is to restore a strong sling across the pelvic outlet, to support the organs above. To restore the integrity of the pelvic floor, the following two things must be accomplished:

1. The musculo-fibrous pelvic sling must be shortened so that the slack is taken up.
2. The vaginal opening (the necessarily weak place in the pelvic floor) must be brought forward under the pubic arch and, consequently, out of the line of direct pressure from above.

Repairing the perineum is known as "perineorrhaphy." Suturing the vaginal wall is designated as "colporrhaphy."

Though the literal meaning of each of these terms is limited, they are by common consent used to indicate the general suturing usually necessary in these cases. A more accurate and comprehensive designation for this operation is "repair of the pelvic floor." This operation comes under the general class known as "plastic operations," which includes also repair of cervix, operation for cystocele and closure of fistulae.

Indications and Contra-indications.

The **indications** for repair of the pelvic floor are:

1. Decided symptoms of loss of support at the pelvic outlet—such as dragging weight in the pelvis, backache and a feeling of weakness there.
2. Prolapse of the vaginal walls, with or without cystocele or rectocele.
3. Prolapse of the uterus.
4. Movable retrodisplacement in which a pessary can not be retained, on account of the laceration at the vaginal outlet.
5. Incontinence of feces, indicating damage to the sphincter ani.

The **contra-indications** are:

1. Absence of decided symptoms of loss of suppport in the pelvic floor.
2. Marked kidney lesion or other serious disease contra-indicating anesthesia.
3. Hemophilia. Skene encountered three such patients. Two of them were operated on before the bleeding tendency was discovered, the result being failure of the operation in each case and, as he remarks, "the development of extreme caution on the part of the operator in selecting cases in the future." In the third case, the fact that the patient was a "bleeder" was elicited in getting the history, and consequently the operation was not advised.
4. Uterine disease with an infectious discharge. The uterine disease should be treated and the infectious discharge checked before any plastic operation is undertaken.

Preparations for the Operation.

The preparations for repair of the pelvic floor may be divided into (1) preparation of the patient, (2) preparation of the instruments and dressings and (3) preparation of the operator and assisstants.

1. Preparation of the Patient. The general preparations as for any operation requiring an anesthetic, are carried out (see preliminary preparation of patient for Abdominal Section—chapter xv).

It is well to time the operation so that the healing surfaces will not be disturbed by the menstrual flow for ten days or two weeks after operation. Consequently, the preferable time for the operation is from three to ten days after menstruation. The antiseptic preparation of the patient in this particular operation is confined to the vagina and adjacent regions. The patient should receive an antiseptic douche once or twice daily up to the time of operation. Several hours before operation or the day before, the field of operation should be shaved. The shaving includes the pubic and perineal regions and the adjacent portions of the thighs and buttocks. The surfaces are then washed with green soap and warm water with a soft brush or cotton-balls. The soap is then washed off with sterile water and the surfaces are washed with bichloride solution (1–2000). The surfaces are then dried with a sterile towel or cotton-balls and covered with a large piece of cotton wrung out of bichloride solution (1–5000).

After the patient is under the anesthetic, the vagina is scrubbed thoroughly with the warm soap-solution, using cotton-balls held in long forceps. Two fingers of the left hand are introduced into the vagina and all portions of the vaginal walls are put on the stretch as they are scrubbed (Figs. 574, 575). A brush is too harsh for this purpose and it can not be handled as satisfactorily as the cotton in the forceps. The external genitals and the entire field of operation is again scrubbed with the soap-solution. The soap is then washed off with sterile water, and the vagina and external surfaces are scrubbed with bichloride solution (1–2000). The sterile cloths are then placed about the field and the patient is ready for operation.

2. Preparation of Instruments and Dressings. The details of the antiseptic preparation of the instruments and dressings are given under Preparations for Abdominal Section, in chapter xv.

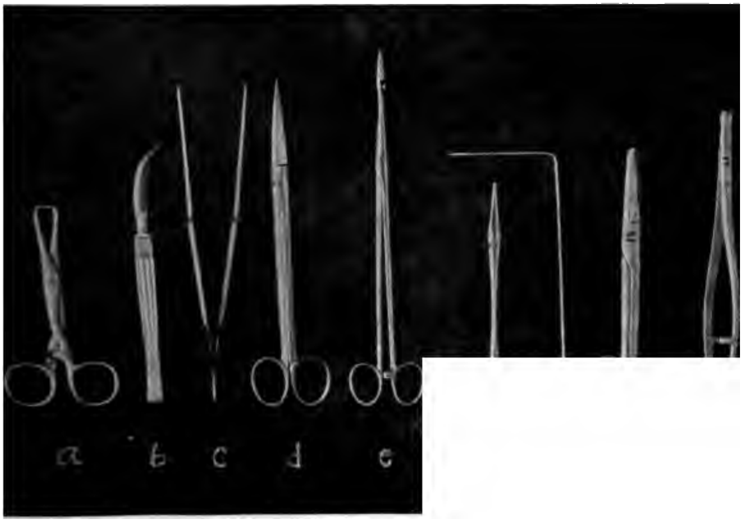


Fig. 497. Instruments for Repair of the Pelvic Floor: a, short tenaculum-forceps (have four); b, bistoury; long tissue-forceps; d, long scissors for denuding; e, vaginal dressing-forceps for sponging (have two): f, mostat-forceps for holding suture ends or catching bleeding points (have eight); g, right-angled vaginal ractor (have two); h, short scissors for cutting suture material; i, Sims' needle-holder; j, number 2, 20-day gut (have six tubes) and strong full-curved round-point needles (have four); k, silkworm-gut (have eight ands) and large full-curved Hagedorn needles (have four). The large needles may be used without a ne-holder.

The instruments required for repair of the pelvic floor are shown in Fig. 497. There should be at hand also:

Leg holders, in the form of uprights attached to the table (Fig. 572).
Perineal pad.
Fountain syringe.
Rubber apron for operator.
Gowns for operator and assistants.

For the anesthetist there should be:

Ether-inhaler and chloroform-inhaler.
Ether and chloroform.
Tongue forceps.
Vaseline, for patient's face.
Hypodermic syringe.
Necessary stimulants.

3. Preparation of Operator and Assistants. The antiseptic and aseptic prepara- ion for the operator and assistants for operative work in general, is given in detail nder Preparations for Abdominal Section (chapter xv). It is not so important o use rubber gloves here as in intra-peritoneal work and, as they interfere more or ss with the manipulations, they may be dispensed with if desired.

Two assistants, beside the anesthetist, are needed for rapid work, one to expose he various portions of the field of operation and the other to sponge away the blood nd handle sutures. A good nurse does well as one of these assistants.

Emmet's Operation.

There are three principal operations for repair of the pelvic floor—(a) Emmet's operation, the area of denudation of which is sometimes referred to as the "butterfly denudation" because of its shape, (b) Hegar's operation, in which comes the "triangular denudation" and (c) Tait's operation, in which the vaginal mucosa over the injured area is raised as a flap, thus splitting the lower part of the recto-vaginal septum into an upper and a lower flap—hence the name "flap-splitting operation," by which it is frequently designated.

Emmet's operation was worked out by Dr. T. A. Emmet about twenty-five years ago (completed operation published in 1883) and, with some modifications, it stands today as one of the best operations for repair of laceration of the pelvic floor.

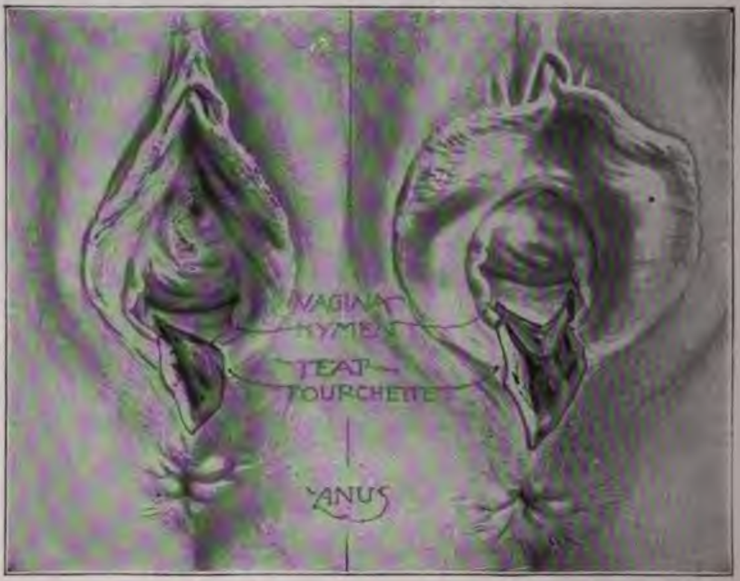


Fig. 498. Recent Lacerations in Labor. A. Laceration involving the perineum and extending up the right vaginal sulcus. B. More severe Laceration, involving the perineum and extending up both vaginal sulci. (Dickinson—*American Text-book of Obstetrics.*)

It tends, more than any other, to restore exactly the relations of the vaginal wall and perineum, as shown in the following explanation. A laceration usually affects first the perineum in the median line, and as the tear extends into the vagina it passes up the sulcus of one or both sides, as shown in Fig. 498. For convenience the apex of the vaginal flap (central flap, Fig. 498-B) may be called "a." On the lateral flaps, the point made by the junction of the vaginal and perineal portion of the flap may be designated by "r," for the flap on the patient's right side, and by "c" for the left side (Fig. 506). Now in the repair of the injury, these three points should be brought together, to form the lower part of the restored vaginal entrance. In the fresh laceration, extending up the sulcus of each side (Fig. 498-B), the parts are not yet distorted by displacement, beyond a slight separation, and the location of these three points is very evident.

In the old tear, however, the parts are much distorted by displacement and scar-tissue has drawn the mucous membrane over the injured area, as indicated in Figs. 239 and 499. These three points are now difficult to identify, but they must be located and brought together. The apex of the vaginal flap is indicated in Fig. 499 by "a," while the points "r" and "c" are indicated by a finger on each side.

In the operation, the vaginal sulcus between "r" and "a" and also the sulcus between "c" and "a," along with the perineum and vaginal entrance, are denuded sufficiently to allow access to and approximation of the torn and separated tissues of the pelvic floor. And as the operation is completed, the points "a" and "r" and "c" come together, as shown in Figs. 506 and 509.

1. Selecting the points. The patient is anethetized, the hips brought slightly over the end of the table (Fig. 573), the legs fastened out of the way by the supports, the parts thoroughly cleansed (Figs. 574, 575) and the vicinity of the field covered with sterile cloths.

The point "a" is found by catching the prominent part of the protruding vaginal wall (Fig. 499) with a tenaculum-forceps and raising it to the anterior margin of the vaginal orifice, just beneath the meatus. This point must be selected with care. It constitutes the lower limit of the restored posterior vaginal wall, and should be low enough to permit of its being brought near the urethral meatus without making the posterior vaginal wall so tense that it pulls the cervix uteri downward. If the new posterior wall is made so short that it pulls the cervix downward, the fundus uteri will go back in time, causing troublesome retroversion. On the other hand the point must be high enough to take the slack out of the posterior vaginal wall, otherwise the repair of the pelvic floor will not be sufficiently thorough.

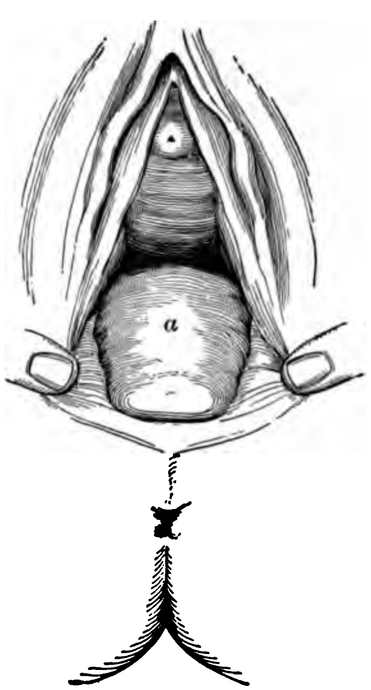


Fig. 499. An old Laceration of the Pelvic Floor, involving both vaginal sulci. a. The prominent part of the projecting posterior vaginal wall. (Penrose—*Diseases of Women.*)

Then select the points "r" and "c" (Fig. 506) at the margins of the vaginal opening. The opening of the duct of the vulvo-vaginal gland of each side is the guide to these points. On each side, the tissues just below the duct opening, constituting the points "r" and "c," are grasped firmly with one of the short tenaculum-forceps, so that they may be retracted as required in the subsequent steps of the operation (Fig. 505). The lower remnant of the hymen, on each side, is sometimes evident and serves to mark the situation of the points under consideration. After the points are grasped they are brought together temporarily, as indicated in Fig. 500, in order to determine if the restored vaginal opening will be sufficiently small.

The next step is to locate the apex of the sulcus-triangle, which is to be denuded on each side. The points "a" and "c," which are already caught with the tenaculum forceps, are pulled upon so as to cause a "line of tension" from each, extending up into the vagina, as indicated in Fig. 501. These lines come together some distance up in the vagina, as represented by the point "b" in Fig. 501—the height of this point depending upon the height of the tear. The triangular area between these lines of tension represents approximately the damaged area on that side, and constitutes the sulcus-triangle to be denuded. The lines of tension and the point at which they come together are determined by touch, and then the lines b–a and b–c are marked by incision with the bistoury. The same maneuver is then carried out on the opposite side.

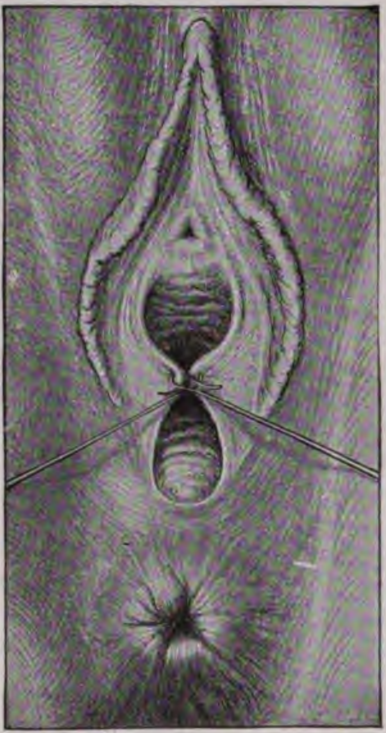


Fig. 500. Emmet's Operation. Selecting the two Lateral Points. The two Lateral Points are caught and brought together temporarily, to see how large the repaired vaginal opening will be. (Kelly—*Operative Gynecology*.)

The damaged area usually extends higher on one side than on the other, and in some exceptionally severe cases extends nearly to the vaginal vault.

2. Outlining the area for denudation. Before beginning the denudation it is well to completely outline the area to be denuded, by incision with the knife. During the process of denudation the parts are necessarily retracted in various directions and the relations disturbed, and unless the limits of the area are definitely marked, the area is likely to be over-reached at some points and imperfectly denuded at others.

The outlining is usually begun by making an incision along the lines of tension in each side of the vagina, as mentioned above. This marks the limits of the denudation in the vagina. Then the points "r" and "c" are connected by a curved incision, that dips down over the perineum far enough to include the damaged area (Figs. 505, 507). In most of the severe tears, this dips down very close to the anus. This incision completes the outline of the area to be denuded, which area has about the shape shown in Fig. 507.

3. Denuding. This comprises removal of the surface-covering over the area outlined and also the excision of some deeper tissue, as explained below.

The most rapid and satisfactory method of **removing the mucosa** is by means of the scissors, straight or curved as preferred. On account of the bleeding from the denuded area, it is well to begin at the bottom and work upward, as the blood will not be so much in the way. The assistant pulls upward and outward on one of the tenaculum-forceps at the sides, so as to cause a line of tension extending down over the damaged perineum. The operator picks up the line of tension at some convenient point on the perineal portion of the outlined area, and cuts off the tense strip of tissue, as indicated in Figs. 502 and 512. This is repeated until the lower portion of the area is denuded. Then the points "a" and "c" are separated by traction on the attached tenaculum-forceps, and the left sulcus-triangle is denuded in the same way. Here the fixed point is at "b" and each strip of tissue, as it is being excised, is made tense as indicated in Fig. 502. When one sulcus is completely denuded, the same process is carried out in the other sulcus (Fig. 503),

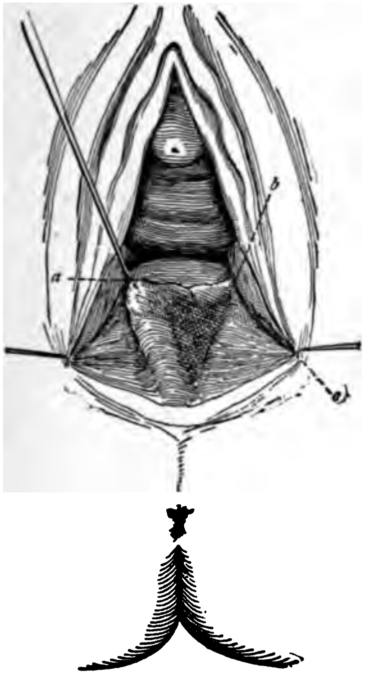


Fig. 501. Emmet's Operation, showing the Lines of Tension at each side of the left vaginal sulcus and their point of meeting at "b." (Penrose—*Diseases of Women.*)

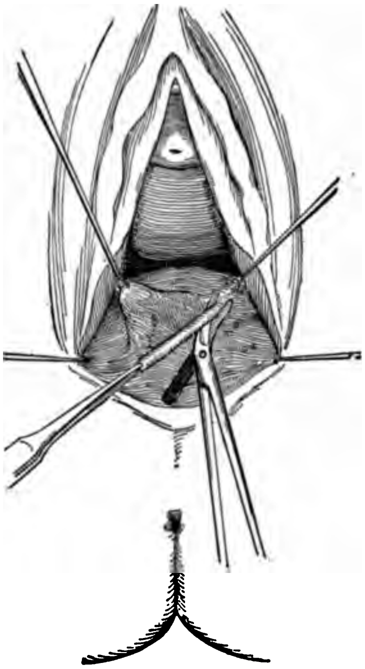


Fig. 502. Emmet's Operation, showing the Method of Denuding the damaged area in the left vaginal sulcus. (Penrose—*Diseases of Women.*)

In the process of denuding, the lines of traction and the direction of cutting may be varied as found most convenient. When the surface-covering has been completely removed, the area has approximately the appearance shown in Fig. 507.

The next step is to make the **deep excision of tissue** in the outer side of each sulcus. This is to remove the principal part of the scar-tissue and other connective tissue lying between the torn ends of the pelvic sling, so that when the deep sutures are passed and tied, the torn portions of the sling may be brought together. The reason for the deep excision of tissue is shown in Fig. 504.

It is carried out by grasping the tissues firmly in the lateral portion of th area and drawing them out so that they may be clipped off with the s indicated in Fig. 505. In this illustration the handle of the scissors s brought farther to the front, so that the points would cut more deeply int eral tissues. One or more thick strips of tissue are removed from th

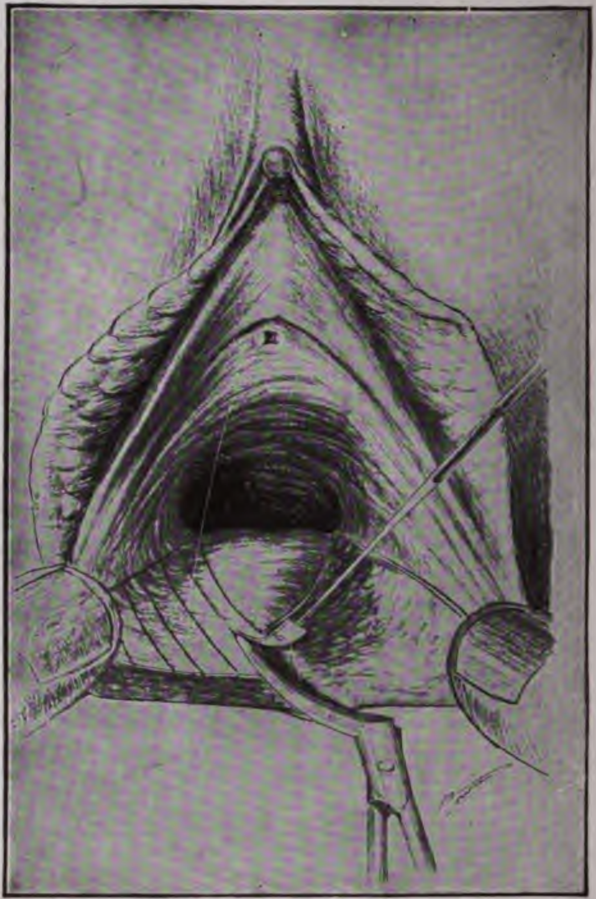


Fig. 503. Emmet's Operation. Diagrammatic representation of how the mucosa is removed in strips, by following the lines of tension. (Gilliam—*Practical Gynecology*.)

enough to accomplish approximately the object explained in Fig. 504, similar strips are removed from the opposite side.

This excision of deep tissue causes free bleeding, but the bleeding ve caught with artery forceps and later included in the deep sutures.

Care must be taken in the excision of tissue and in passing the deep sut the rectum is not injured. Keep well to the lateral regions of the pelvis a from the rectum.

The removal of the intervening tissue and the approximation of the separated ends of the pelvic sling are accomplished more or less perfectly as the operation is more or less perfectly carried out. The fact that the sling is really shortened and the pelvic floor accordingly restored, can be demonstrated by making a digital examination at the completion of the operation. The result of the operation is not simply a narrowing of the vaginal outlet nor only a restoration of the perineum, but the vagina is lifted forward and a firm support is formed, outside of its walls as far up as the operation extends. One cause of failure to secure the desired result is that the excision of tissue is not continued far enough up the sulcus towards the cervix and, also, that not sufficient tissue is excised at the sides of the vaginal sulci

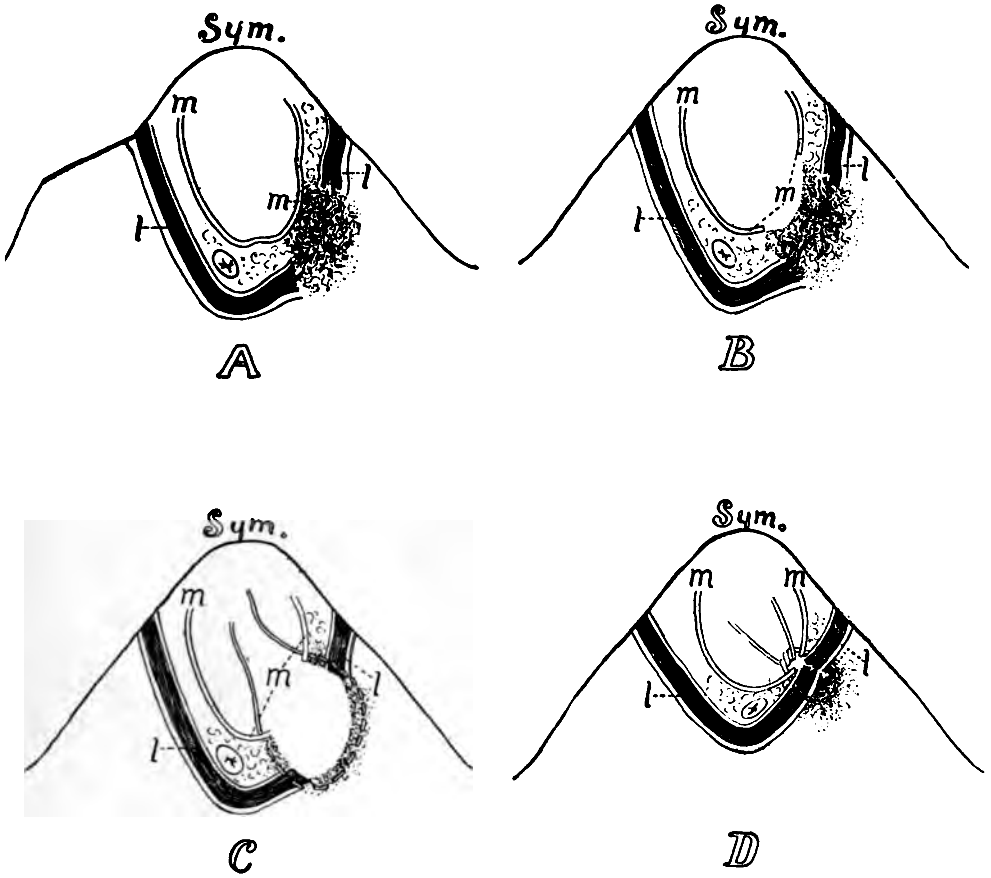


Fig. 504. Explanation of the Excision of Deep Tissues at the injured portion of the Pelvic Sling. l. Pelvic Sling, composed of the levator ani muscles and the fascia above and below; m. Vaginal Mucosa; s. Scar-tissue between the torn and separated ends of the Pelvic Sling. A. Before Denudation. B. After Denudation, the vaginal mucosa having been removed over the injured area. The scar-tissue still separates the torn ends of the pelvic sling. C. After the Excision of Deep Tissues in the injured area. This shows also the Course of the Sutures for approximating the torn ends of the musculo-fibrous sling. D. The sutures tied, approximating the torn and separated ends of the pelvic sling.

to permit efficient approximation of the separated ends of the pelvic sling. It is not necessary to remove all the tissue lying between the separated ends of the levator ani, but it is necessary to remove enough of it to shorten the pelvic sling sufficiently to take up the slack.

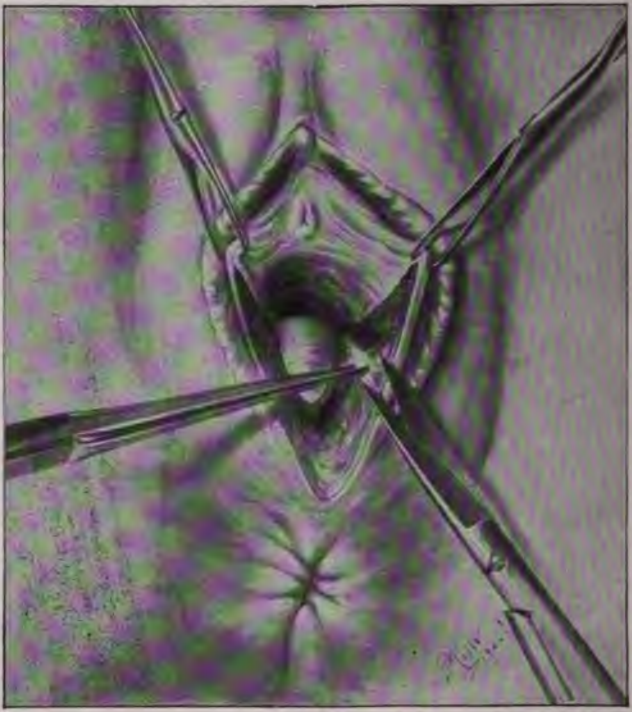


Fig. 505. Emmet's Operation. Indicating the Method of Removing the Deep Tissue from the outer side of the denuded area in each vaginal sulcus. The handle of the scissors should come more to the front, to indicate that the points cut deeper into the lateral tissues.

Explanatory Note for Fig. 506. The General Scheme for Suturing in the Emmet Operation.

A. The Inside Sutures Passed, but not yet tied. These sutures may be interrupted or continuous, or if ferred, the deeper parts of the wounds may be approximated by buried sutures. The course of the "crown sut is here indicated, but it is usually not passed until later.

B. The Inside Sutures Tied and the Outside Sutures Passed, including the Crown Suture. The "crown sut brings together the points r, a, c. It is usually passed last.

C. The Outside Sutures Tied, except the Crown Suture. The tying of the Crown Suture completes the proximation.

D. The Additional Sutures required when the tear extends into the Rectum. The rent in the rectal w closed by sutures Nos. 1, 2 and 3. These are passed from the rectal surface and may be of catgut or fine Suture No. 4 is passed from the skin surface. It is a strong suture of silkworm-gut and approximates the end the sphincter ani muscle and also the tissues above the rectal tear along its whole length. Care should be take passing it to catch the retracted sphincter ends and also the tissues all the way to above the apex of the re tear, as here indicated. Before this suture is tied, the torn and retracted ends of the sphincter ani mu should be brought together by one or two buried catgut sutures, as shown in Figs. 510 and 511.

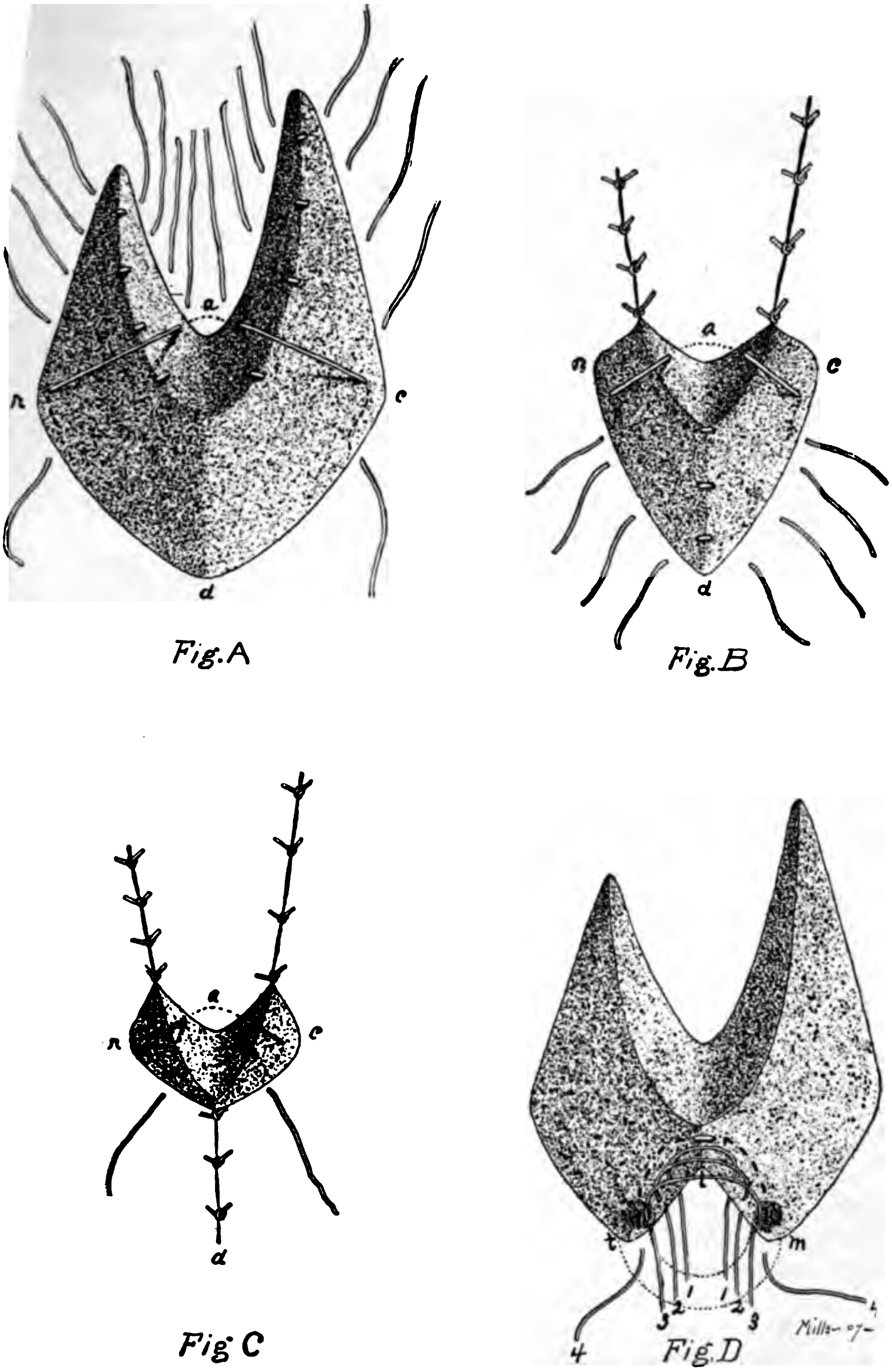


Fig. 506. The General Scheme of Suturing in Emmet's Operation. See Explanatory Note at bottom preceding page.

This deep excision of tissue in the sulcus of each side, was not embodied by Emmet in his operation. It is a later development, but it is simply a more thorough carrying out of his original idea that the operation must extend into and unite the torn structures at the sides of the vagina. After completing the superficial denudation and the deep excision of tissue and checking the hemorrhage, the suturing is begun.

4. Suturing. The sutures are to be passed so that they will approximate the surfaces, as shown in Fig. 506. The sutures closing the vaginal portion of the wound are conveniently designated as "inside sutures," and those closing the perineal portion of the wound as "outside sutures."

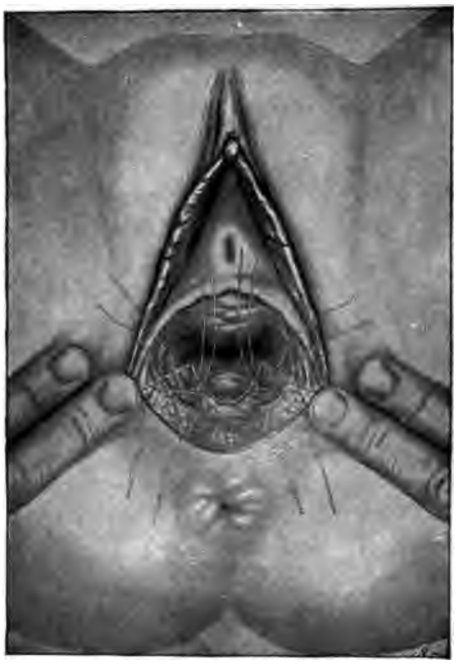


Fig. 507. Emmet's Operation. Giving a general idea of the area of Denudation and the directions in which the sutures are passed. (Pryor—*Operative Gynecology.*)

All inside sutures and all buried sutures, should be of absorbable material Catgut, No. 2, 20-day, is satisfactory. Plain catgut is absorbed too quickly For the outside sutures, which are to be removed at the end of ten days, silkworm-gut is the preferable material.

The deeper parts may be approximated (a) by a single row of interrupted sutures, as shown in Figs. 506, 507, 508 and 509, or (b) by a single continuous suture on each side extending to the depth of the wound, or (c) by buried sutures to close the depth of the wound on each side and then a continuous suture to close the superficial portion.

The last mentioned method is the preferable one. The approximation of the deep tissues by buried sutures, both in the sulcus of each side and lower down in the main part of the wound, adds much to the effectiveness of the operation. The deep tissues are drawn together by these buried sutures so that a good strong pelvic floor is formed, and may be felt even before the superficial sutures are passed. These buried sutures, for approximating deep tissues in various parts of the wound, are used also in the other forms of pelvic-floor repair. The method of their application is practically the same in all. They are shown in Figs. 513, 514, 518 and 519.

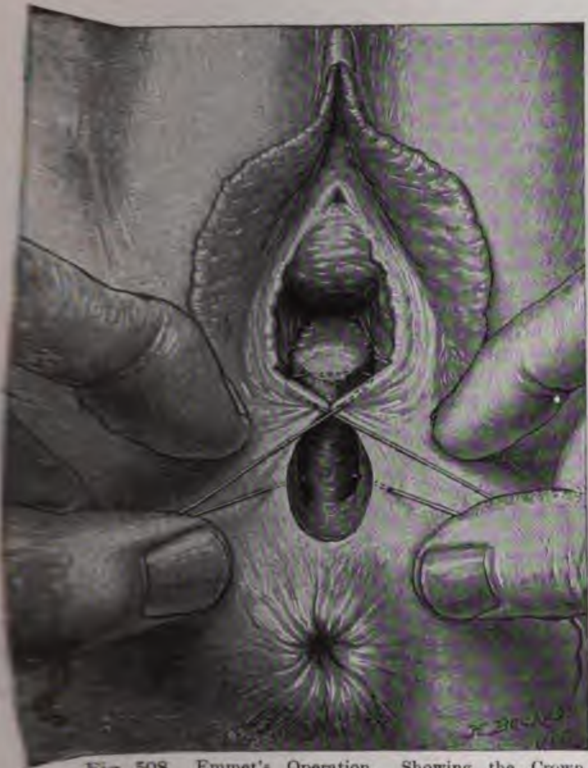


Fig. 508. Emmet's Operation. Showing the Crown Suture and the bringing together of the points "a", "r" and "c." The vaginal sulci have been sutured. Only two of the perineal sutures are shown. (Kelly—*Operative Gynecology.*)

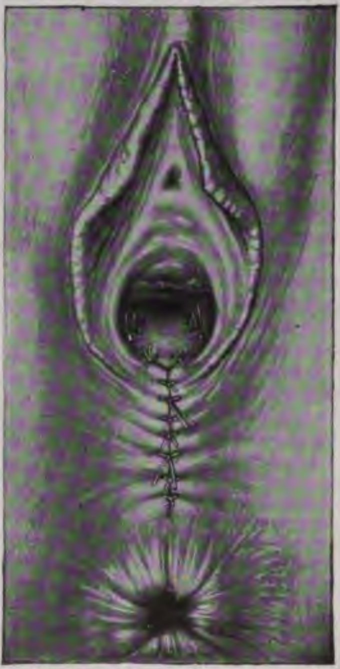


Fig. 509. Emmet's Operation. All sutures tied. Showing the line of approximation in the perineum and in each vaginal sulcus, and showing also the bringing together of the points "a," "r" and "c." (Kelly—*Operative Gynecology.*)

5. Laceration into the rectum. When the tear has extended into the rectum (laceration through the sphincter, "third degree tear"), some additional steps are necessary.

A more thorough preparation of the intestinal tract is required. For three or four days before operation, some laxative saline solution is given every four to eight hours, as necessary to give two or three good bowel movements daily. During this preparatory period the patient should be lying down most of the time, and the diet should be liquids and semi-solids, not more than a taste of solid articles of food being allowed. The laxatives should be stopped the day before operation and the lower bowel cleared out by a high enema the evening before operation. The next morning the patient is given an enema, high or low as thought advisable. This last enema should be given at least two hours before the time set for the operation. If given later, a portion of it is liable to be passed on the table, annoying the operator and jeopardizing the asepsis of the operation wounds.

The antiseptic preparations are the same as for the other form of tear.

In the technique of the operation, in these cases of laceration of the sphincter ani muscle, there are four special points, but before considering these points directly, attention should be called to certain peculiarities of these tears.

A recent laceration into the rectum presents the condition shown in Fig. 506-D. The torn and separated ends of the sphincter ani muscle are at "t" and "m." The apex of the tear in the rectal wall is at "l." But after several months a decided change has taken place in the relation of the parts. By the contraction of the sphincter muscle, its ends are still further separated, and this tends to pull down the apex of the rectal-wall tear, so that the line t–l–m becomes after a time, almost a straight line. This condition is well shown in Fig. 234, the torn ends of the sphincter being represented by the small dimple at each side of the widened anus. This condition is shown likewise in Figs. 232 and 233, where may be seen also the usual protrusion of a small area of rectal mucosa.

The four special points in the technique above mentioned, are as follows:

a. Preliminary stretching of the contracted sphincter ani muscle should be carried out. The muscle may be felt as a small roll under the skin, in the situation indicated in Figs. 506–D and 234. At the beginning of the operation, before any denuding is done, the contracted sphincter muscle should be grasped firmly near each end, between the thumb and finger, and strongly stretched. This overcomes the chronically shortened condition of the muscle and is further advantageous in that it produces temporary partial paralysis of the muscle and prevents, for a few days, the tugging on the sutured ends which would otherwise take place. It also permits the escape of gas and feces from the rectum with less discomfort to the patient and less danger to the wound.

b. The area of denudation must be extended downward so as to include the dimple over each end of the torn sphincter ani muscle, as shown in Fig. 510.

c. The tear in the rectal wall must be closed by a separate row of sutures. These sutures may be of catgut or fine silk—in either case they take care of themselves and do not need to be removed. They are passed from the rectal surface as indicated in Fig. 506–D, and when tied the knots lie in the rectum.

d. The ends of the torn sphincter muscle are brought directly together. To do this it is necessary, after the regular denudation, to clip out the scar tissue from over the torn ends of the muscle. This tissue is raised, as shown in Fig. 510, and clipped off with the scissors. This permits the muscle ends to be brought directly together by one or two buried sutures (Fig. 511). Their union is reinforced by the lowest external suture of silkworm-gut, which is carefully passed so as to include the ends of the sphincter muscle and the apex of the tear in the rectal wall, as indicated in Fig. 506–D.

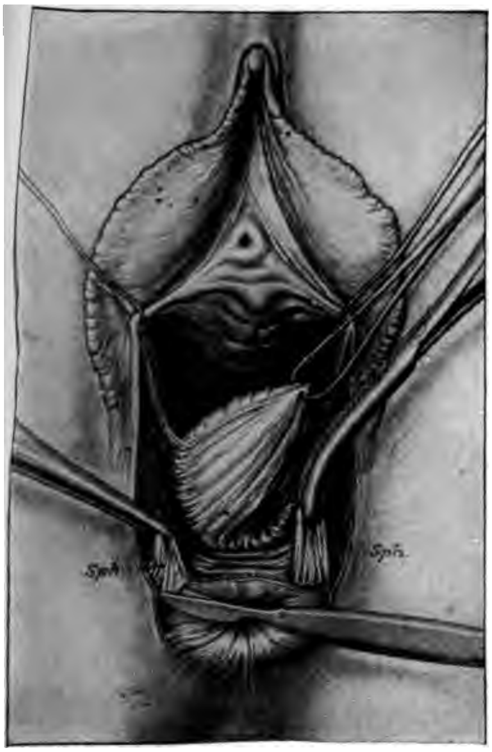


Fig. 510. Emmet's Operation. The laceration has involved the Sphincter Ani Muscle. The scar-tissue over each end of the torn muscle is picked up and excised. (Kelly—*Operative Gynecology.*)

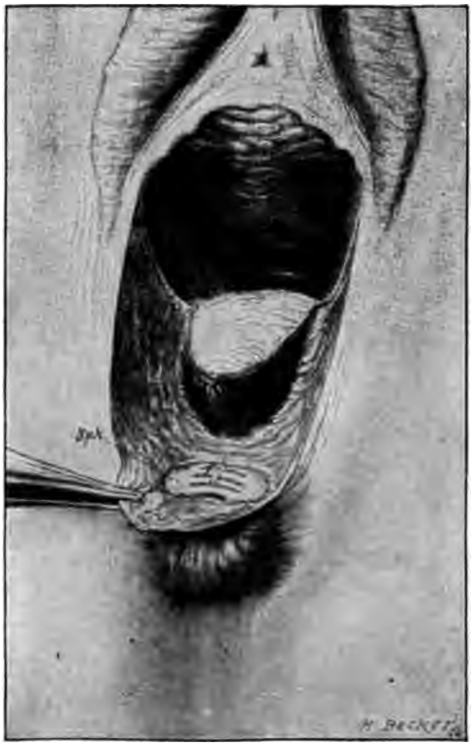


Fig. 511. Emmet's Operation. The bared ends of the torn Sphincter Ani Muscle have been brought together and united by buried catgut sutures. (Kelly—*Operative Gynecology.*)

6. After-Treatment in repair of the pelvic floor. The details of the care of a patient after repair of the pelvic floor may be grouped as follows:

a. KNEES TOGETHER. For the first twenty-four hours after operation it is well to have the patient's knees held together by a bandage around them, a thick pad of cotton being placed between the knees to prevent discomfort. After the first day or two, the knees may be released, unless the patient is very nervous and restless. Ordinarly, the pain on separation of the thighs is decided enough to prevent injurious separation.

b. Changing the Dressing. The genitals and pubic region must be kept covered with a large sterile dressing of absorbent cotton or gauze. When the dressing has to be removed for any cause, for example, to allow the patient to urinate, the nurse should proceed as follows:

Remove the dressing, slip the bed-pan under patient and allow her to urinate. Cleanse the genitals by pouring a 1–5000 bichloride solution over them from a sterile pitcher (pitcher-douche). Remove the bed-pan, apply a fresh sterile dressing and reapply the T-bandage. If the patient complains of persistent smarting from the bichloride solution, a weak carbolic solution or lysol solution may be used instead of the bichloride.

c. Relief of Pain. After a thorough repair of the pelvic floor there is, as a rule, considerable pain for the first few days. This consists of superficial smarting and deep acheing and occasional sharp pains due to muscular action. All these are relieved considerably by hot moist packs applied to the perineum. Disinfect the hands and then take a large thick piece of absorbent cotton, as large as the two hands, soak in hot carbolic solution (½%), squeeze it sufficiently to prevent dripping and then apply it while steaming to the perineum. Put a large piece of oiled silk over the cotton, to keep in the moisture, and then reapply the T-bandage. Outside this it is well to place a hot water bag, to maintain the heat. This hot application, changed as often as it becomes cool, usually gives considerable relief and may be used frequently, or if necessary almost continuously, for the first few days.

If the smarting is very troublesome, carbolic or lysol solution may be used for cleansing the parts. If the acheing and pain is still sufficiently troublesome to prevent rest, give sodium bromide as necessary to allay nervousness and secure sleep, particularly at night. If the shooting pains through the perineum are persistent, it may be necessary to give codeine phosphate hypodermatically or by the mouth, in half-grain doses, repeated as often as necessary to give rest.

The pains and soreness gradually disappear and after the first few days, as a rule, no sedatives are required.

d. Diet. The day after operation liquid diet is given, and after that ordinary light diet, until the bowels have moved freely, when regular diet is gradually resumed.

When the laceration has extended through the sphincter ani, the patient should be kept on liquid diet exclusively until after the first bowel movement. In such a case there should be no bowel movement for four full days, and if necessary some mixture such as bismuth and opium is given to hold the bowels in check that long.

e. Care of Bladder. If the patient can pass the urine herself, I prefer to have her do so. The catheter should be used only if necessary. Aside from the ever-present danger of cystitis, the use of the catheter is a disadvantage in that the manipulations necessary to catheterization disturb the parts and do more harm than the contact of healthy urine, especially as the urine is at once removed by the cleansing solution.

In many cases however, particularly with deep lacerations, the patient cannot urinate at first and must be catheterized for one or more days. The frequency catheterization depends somewhat on the quantity of urine secreted. Ordinarily it is required about every eight hours. For the details of catheterization see chapter XVI.

f. VAGINAL DOUCHES. Ordinarily, I prefer not to disturb the interior of the vagina with douches for the first three days. After that it is well to give a bichloride douche (1–5000) or lysol douche once daily. In introducing the douche-nozzle the nurse should be careful to carry the point along the anterior vaginal wall so that there may be no chance of its going into the wound in the posterior wall.

g. CARE OF THE BOWELS. After repair of the ordinary laceration, the bowels should be moved in two days by a purgative. Several hours after the purgative is taken, when the patient has a desire for bowel movement, an enema of two ounces of olive oil in a pint of water may be given. This softens the fecal masses, lubricates the rectum and does not cause the smarting that is often so troublesome after the ordinary soap-water enema. After that, laxatives should be given as necessary to secure one or two bowel-movements daily.

In those cases where it has been necessary to repair the sphincter ani muscle and rectal wall, there should be no bowel movement for four full days. If necessary, some preparation should be given to keep the bowels quiet and prevent movement. When it is time for the bowels to move, a purgative is given and when the desire for defecation comes on, two to four ounces of olive oil should be injected high into the rectum and allowed to remain for some time. The oil softens the fecal masses and at the same time lubricates all the surfaces, so there is much less danger of the rectal wound being torn open. When there has been repair of the rectal wall, the small oil enema is better than the large water enema, as the large quantity of water, if injected into the rectum only, may stretch the wall and open the wound. Great care is necessary in giving the first enema after repair of a laceration extending into the rectum, and unless the nurse has had experience in such cases the physician had better give it himself. If the point of the syringe is directed too far forward it is apt to break open the rectal wound. On that account it is well not to introduce the hard-rubber syringe point into the rectum but to introduce a soft-rubber catheter and give the injection of oil through that. The patient should be cautioned to avoid all straining efforts in defecation. If the bowels do not move easily and without straining, she should wait for a repetition of the needed enema or purgative.

h. REMOVING THE SUTURES. The silkworm-gut sutures are removed in eight to twelve days. By that time they have usually begun to cut into the tissues and no longer give support. If some suture causes irritation it may be removed any time after the fifth day, but unless there is marked irritation all the sutures should be left as long as they give support, usually for ten days. The inside sutures in the vagina and in the rectum take care of themselves.

i. GETTING UP. The patient should be kept in bed three full weeks. She may then be allowed out of bed gradually, each day more and more, so that by the end of the fourth week she is ready to leave the hospital. If the patient is allowed up too soon, there may be stretching of the newly-healed tissues and recurrence of the old trouble. It may seem strange that the patient is kept in bed longer than for an abdominal section, but there is good reason for it. So much strain comes on the pelvic sling as soon as the patient assumes the upright posture, that stretching of the repaired sling is very likely to take place unless the scar-tissue has had time to become firm.

j. GENERAL AFTER-CARE. It is a good plan to take advantage of the patient's confinement to bed to improve her general health. Many of these patients are weak, anemic, nervous and generally "run down," as a result of the long continued pelvic distress. In such a case, after the first three or four days, put the patient on a good tonic, containing iron and such additional drugs as may be indicated in the particular case. The patient may be given large quantities of milk in addition to the other food, both at regular meal times and between meals and at night, the amount of nourishment taken each twenty-four hours being gradually increased as the patient can bear it. In many cases it is of much benefit to employ massage, passive movements, salt-rubs and the various other measures used in the "rest cure" for neurasthenia.

The tonics should in most cases be continued two or three months after the patient leaves the bed. The bowels must be regulated by laxatives so there will be no straining. Heavy lifting must be avoided. Sexual intercourse should be postponed for at least one month after the patient is up and about.

Hegar's Operation.

In this operation, sometimes called the Simon-Hegar operation, the lower part of the area of denudation, including the perineal and rectal wounds, is the same as in Emmet's operation, and is sutured in about the same way. The upper part is different in that it extends up the center of the posterior vaginal wall (Fig. 512) instead of up each lateral sulcus. This gives, within the vagina, simply a triangular area of denudation, with the apex lying high up on the posterior vaginal wall.

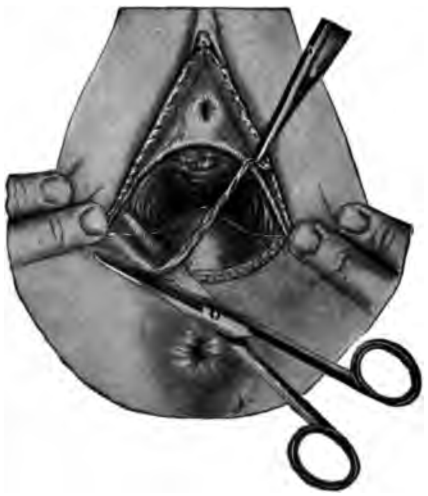


Fig. 512. Hegar's Operation. Showing the outline of the area of Denudation, and also the method of removing strips of mucosa with the scissors. (Pryor—*Gynecology*.)

This area of denudation may be closed by sutures which pass from side to side of the triangle. The first suture is passed near the apex and the next one a third of an inch below and so on down, practically the same as in suturing a sulcus in the Emmet operation (Fig. 506–A), until all the sutures are passed. The sutures are then tied, closing the vaginal portion of the wound.

In place of the single row of interrupted sutures, it is preferable to approximate the deep tissues by buried sutures and then close the superficial portion by another row, as shown in Figs. 513 and 514. Both the deep sutures and superficial sutures may be interrupted or continuous, as preferred.

Hegar's operation is more simple

an Emmet's and can be completed more quickly. When the denudation is ended well out to the sides and some deep excision of tissue is made, as cribed under the Emmet operation (Fig. 504), the Hegar operation gives a d result. Its principal effects are:

It removes the excess of posterior vaginal wall which, in the form of colpocele rectocele, projects from the orifice and when marked tends to drag down the vix uteri.

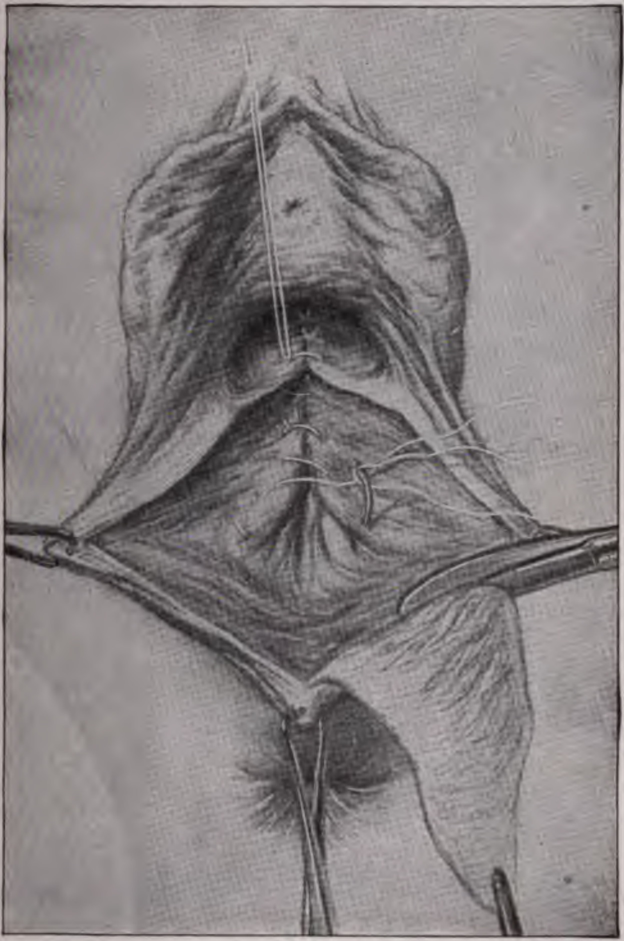


Fig. 513. Hegar's Operation. Showing the method of bringing together the tissues by Buried Sutures. (Döderlein and Krönig—*Operative Gynakologie.*)

. It brings together in the median the lateral pelvic tissues about the lower part the vagina. These are brought together between the rectum and vagina. w some of these tissues normally lie between the rectum and vagina, but most as the patient assumes the upright posture, that stretching very likely to take place unless the scar-tissue has had time

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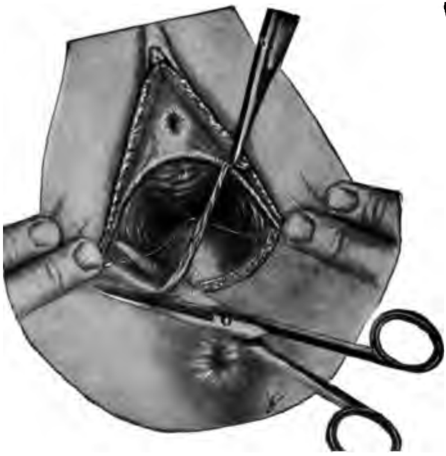

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a. It removes the excess of posterior vaginal wall which, in the form of colpocele rectocele, projects from the orifice and when marked tends to drag down the cervix uteri.

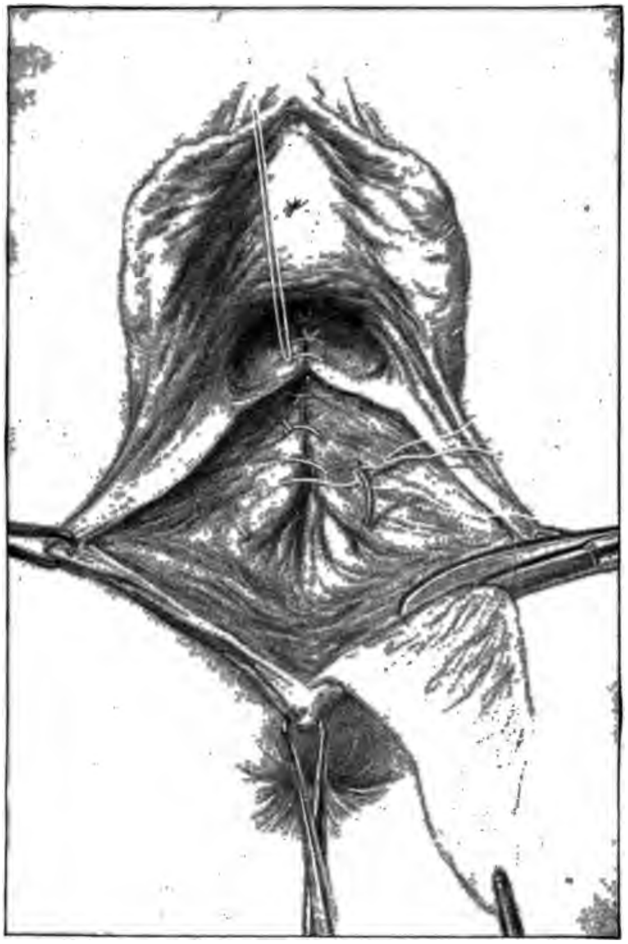


Fig. 513. Hegar's Operation. Showing the method of bringing together the tissues by Buried Sutures. (Döderlein and Krönig—*Operative Gynakologie*.)

b. It brings together in the median the lateral pelvic tissues about the lower part of the vagina. These are brought together between the rectum and vagina. Now some of these tissues normally lie between the rectum and vagina, but most of them pass back of the rectum (Figs. 489, 493). In bringing them together between the rectum and vagina the operation does not make an anatomical restoration of the pelvic sling, but it does to a large extent make a ***physiological*** restoration of the sling, in that the sling is shortened by this approximation of its sides between the rectum and vagina, and the slack is thus taken up. The line of support

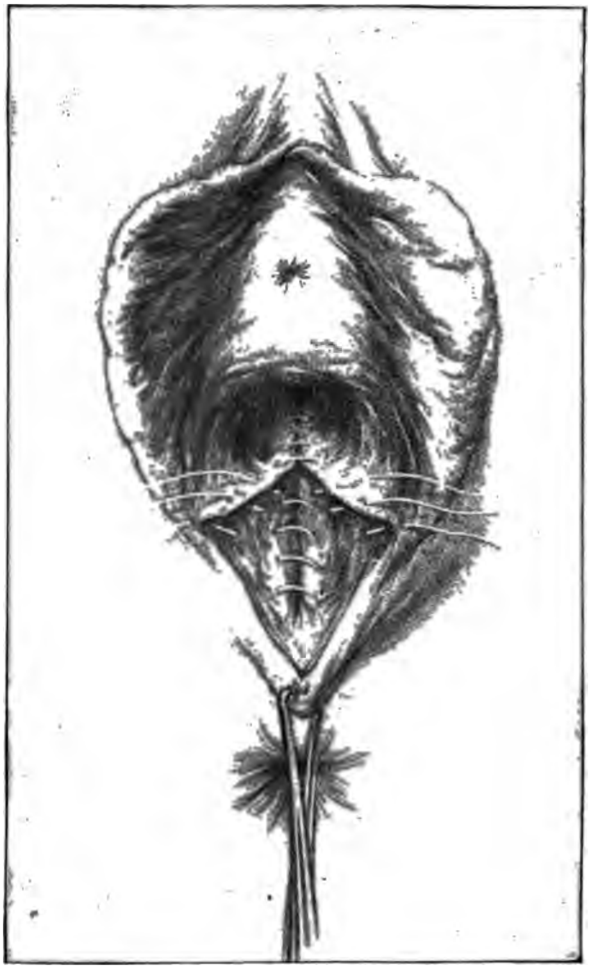


Fig. 514. Hegar's Operation. Showing the closure of the superficial portion of the vaginal wound by interupted sutures. A continuous suture may be used if preferred. (Döderlein and Krönig —*Operative Gynäkologie.*)

in the pelvic floor then runs *between* the rectum and vagina instead of back of the rectum as normally. When the shortening is sufficient, good support is secured, with consequent relief of the distressing symptoms.

This drawing together of lateral tissues between the rectum and vagina at the anterior part of the pelvic sling, and their union there by scar-tissue, takes place to a greater or less extent in practically all operations for the restoration of the pelvic floor—in Emmet's, Hegar's, Tait's and the various modifications of each—and the careful bringing together of these deep lateral tissues by buried sutures is an important step in each of the operations.

Tait's Operation.

This is commonly known as the "flap-splitting" operation. It is called also the Sänger-Tait operation.

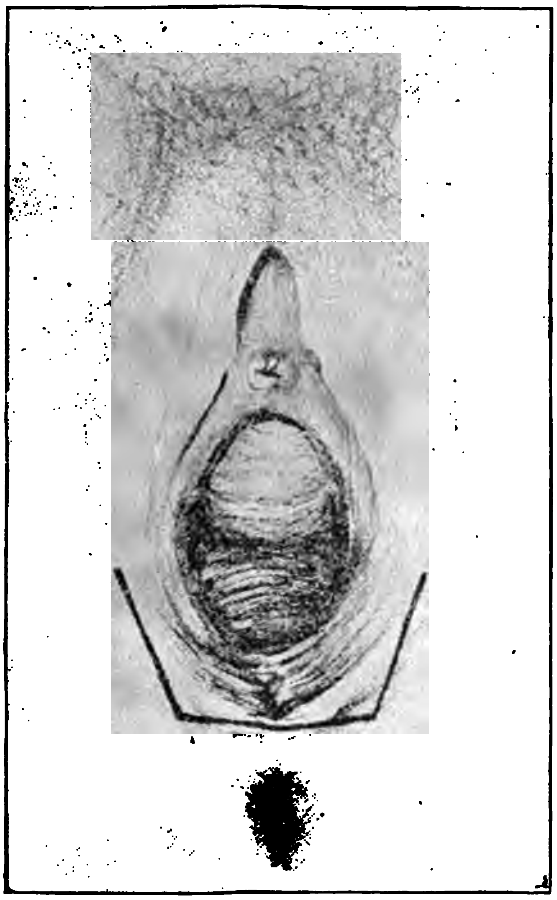


Fig. 515. Tait's Operation. The Line of Incision for Ordinary Laceration of the pelvic floor. (Thomas and Munde —*Diseases of Women*.)

An incision is made along the lower margin of the area to be denuded, as shown in Fig. 515, and the mucous membrane is raised as a flap, as shown in Fig. 518.

The area of denudation is nearly the same as in Hegar's operation but it has over it a large flap. This flap is both an advantage and a disadvantage.

One **advantage** is that it acts as a roof to protect the repaired area from the secretions from above which, in the other forms of operation, sometimes infect the wound and cause partial or complete failure. Furthermore, the flap-method gives a large raw surface for approximation without any loss of tissue, and the amount of tissue left in the flap adds somewhat to the mass which fills the weak place in the pelvic floor.

A distinct **disadvantage** of the flap is that it may prevent free access to the upper parts of the wounds. When the laceration extends very high, the deeper pa
can not be so easily denuded nor sutured to the best advantage.

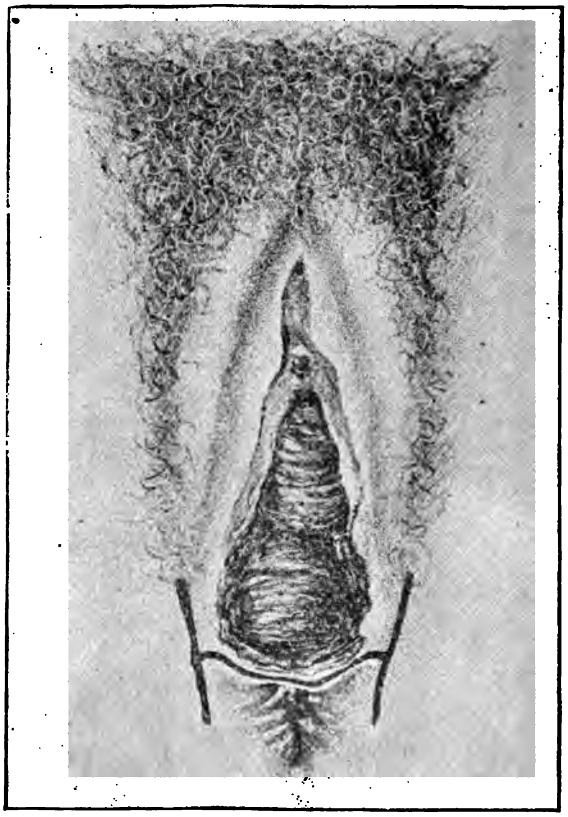


Fig. 516. Tait's Operation. The Line of Incision for Laceration into the Rectum. The short incision extending downward from each corner of the regular incision is for the purpose of exposing the torn and retracted ends of the sphincter ani muscle. (Thomas and Munde—*Diseases of Women.*)

This operation is especially applicable in those cases where it is important
avoid loss of tissue, particularly in cases of laceration into the rectum that ha
resisted one or two previous operations. In some such cases, there is so much sc
tissue and apparently so much loss of tissue that approximation over a wide a
by ordinary denudation can not be secured without injurious tension. In suc

case the main object is to secure union of the sphincter muscle and the rectal wall, and this is more certain of attainment by the Tait operation, because approximation over a large area is secured without loss of tissue and without injurious tension and also because the united surfaces are better protected from vaginal and rectal fluids.

The special steps in the operation are as follows:

1. MAKING THE INCISION, from which the flap may be raised. For the ordinary laceration, the incision has the outline shown in Fig. 515. When the laceration extends through the sphincter ani, special short incisions are made on one each side, extending from the lateral part of the main incision downward over the dimples formed by the retracted ends of the torn sphincter, as shown in Fig. 516. The incision for raising the flap may be conveniently made with scissors, as shown in Fig. 517.

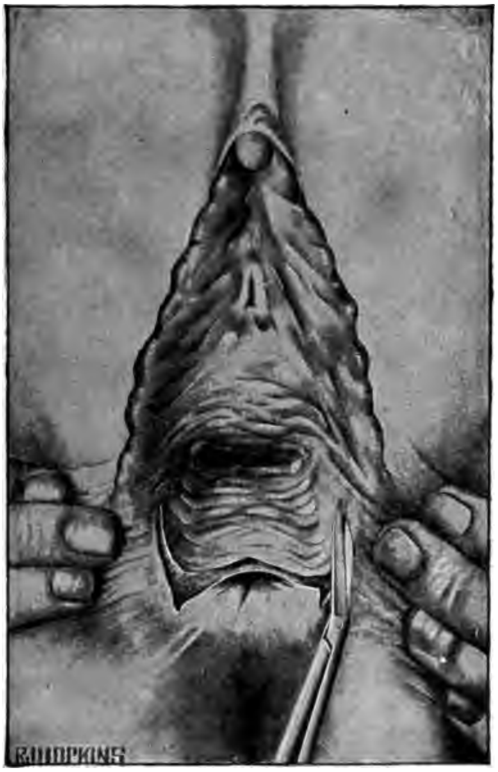


Fig. 517. Tait's Operation. Making the Incision with Scissors. (Reed—*Text-book of Gynecology*.)

2. RAISING THE FLAP. After making the incision (Fig. 517), dissection is made up the recto-vaginal septum and also out into the lateral tissues, so that a flap is raised as shown in Fig. 518. When the tear extends into the rectum, the dissection is made so that the rectal portion of the wound also forms a flap that may be turned down and folded somewhat and sutured, uniting the torn ends of the sphincter and closing the tear in the rectal wall.

3. Suturing. This does not differ essentially from the suturing in the oth operations. It was formerly the custom to suture only from the perineal surfac the silkworm-gut sutures being passed deeply as in closing the perineal portion

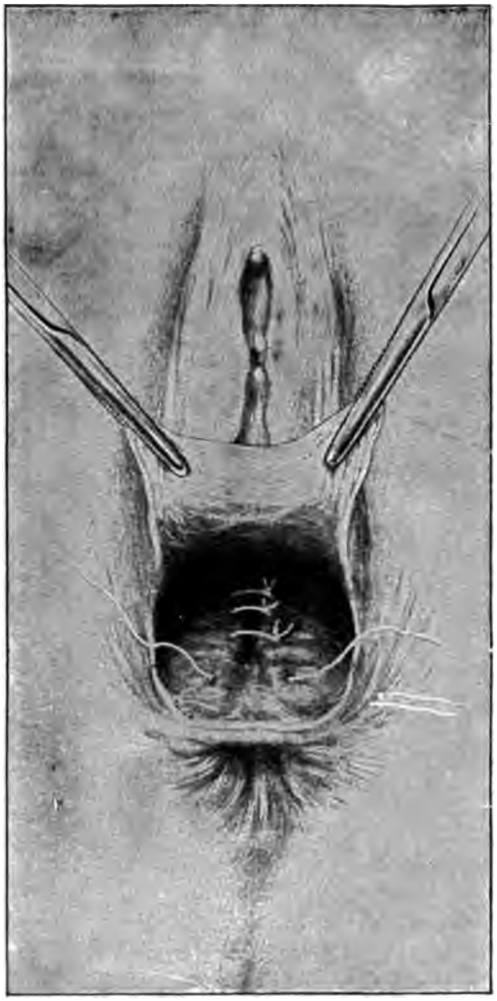


Fig. 518. Tait's Operation. Bringing the deep tissues together by Buried Sutures. The flap is raised out of the way. (Döderlein and Krönig—*Operative Gynakologie.*)

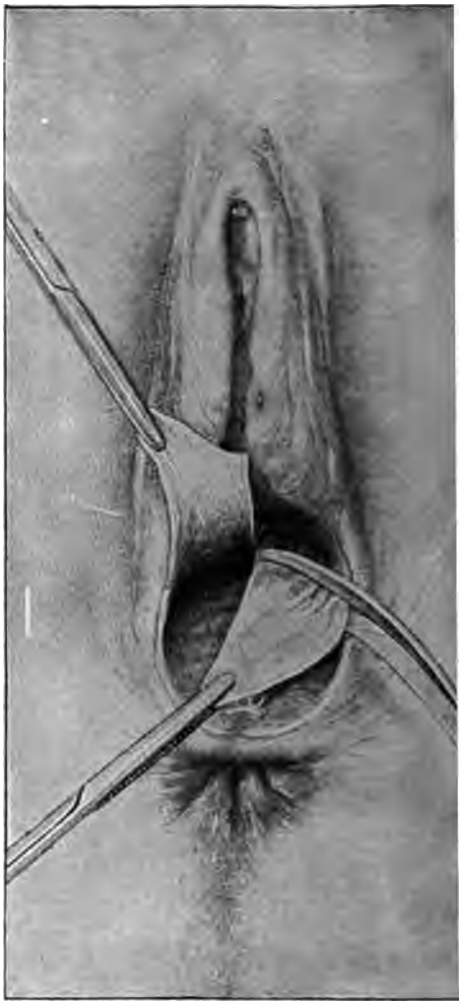
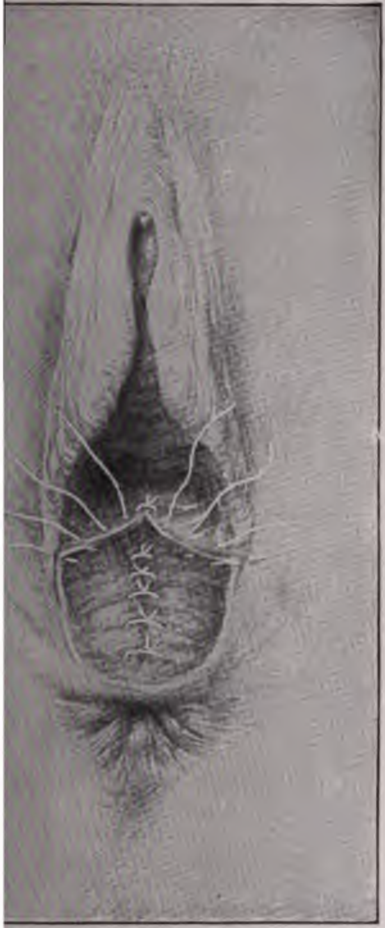


Fig. 519. Tait's Operation. The deep tissues h been approximated by Buried Sutures. The Red dant portions of the Flap are being cut away. (Dö lein and Krönig—*Operative Gynakologie.*)

the wound in Emmet's and Hegar's operations. The operation is much more effective, however, when the deep lateral tissues are first brought together by buried sutures, as shown in Fig. 518. The perineal portion is then closed in the usual way errupted silkworm-gut sutures, passed well out to the sides and very deeply, so ring the lateral tissues from each side firmly together in the median below stored vagina.



Tait's Operation. Showing the deep cial sutures. The redundant portions of ve been removed. Continuous sutures ed if preferred. (Döderlein and Krönig *Gynakologie.*)

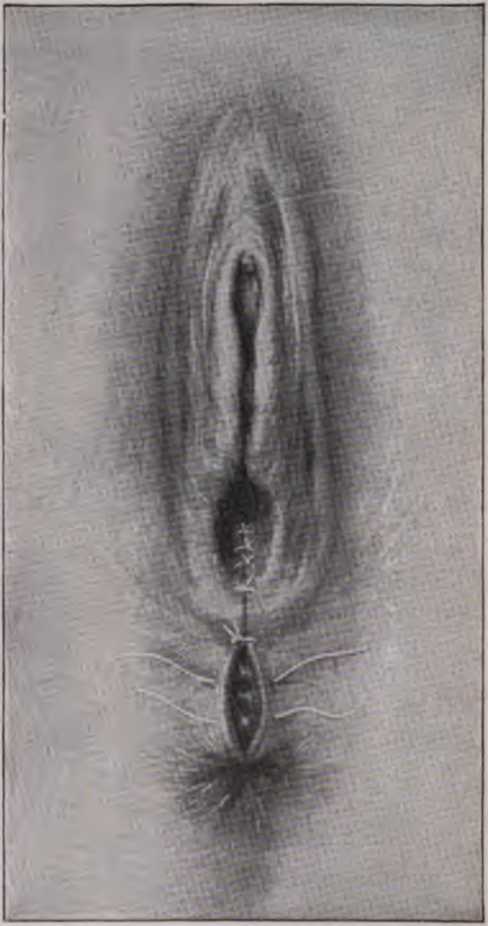


Fig. 521. Tait's Operation. Showing the line of approximation on the perineum and in the vagina. All vaginal sutures and all buried sutures are of catgut. The perineal sutures are preferably of silkworm-gut. (Döderlein and Krönig—*Operative Gynakologie.*)

re is usually more or less excess of flap—consequently it is removed, as shown . 519, and the anterior edges of the flap are united by catgut, as indicated s. 520 and 521.

Other Operations.

There are several other operations for the repair of the pelvic floor, most of them being modifications of Emmet's or Hegar's or Tait's operation, the lines of denudation and of suturing varying in each case to suit the operator.

There is one operation, however, essentially different from those previously described, and that is the operation carried out by Harris. In this, the levator ani muscle itself is exposed by dissection and the torn ends and the scar-tissue lying beween them, are excised. The separated ends of the muscle are then brought together by sutures and the vaginal mucosa is closed over them. On paper this operation is the ideal one, but in the actual application to the conditions found in the pelvis in these cases, its advantages are not so apparent. In the severe cases there is scar-tissue extending all through the damaged area about the torn ends of the muscle, and this interferes with their smooth dissection and clean exposure. Under these circumstances the accurate isolation of the levator ani muscles, as contemplated, requires so much dissection and handling of the deep tissues that it adds considerably to the severity of the operation and the length of anesthesia required. I prefer the passing of buried sutures through the anterior margins of the pelvic sling. This margin, lying on each side beneath the raised flap, is caught with a small tenaculum forcep, and the two are brought together in the median line and sutured there.

COLPOCELE, RECTOCELE, CYSTOCELE.

In many cases of laceration of the pelvic floor, there is considerable protrusion of the vaginal walls, constituting **colpocele.** It may be the posterior vaginal wall (posterior colpocele—Figs. 239) or it may be the anterior vaginal (anterior colpocele).

If the rectal wall follows the prolapsing posterior vaginal wall, the condition is called **rectocele** (Figs. 240, 241, 244, 245, 246). Rectocele is, of course, corrected by the regular repair of the pelvic floor.

If the bladder follows the prolapsing anterior vaginal wall, the condition is called **cystocele** (Figs. 240, 241, 242, 243). Cystocele, when present, requires a special operative measure for its cure, hence it is necessary to give it some particular consideration.

Operation for Cystocele.

When decided prolapse of the anterior vaginal wall and base of the bladder is present, that should ordinarily be taken care of at the same time that the posterior portion of the pelvic floor is repaired. The operative measure for the correction of this condition is designated as "anterior colporrhaphy" and also as "cystocele operation." It is carried out just previous to the denudation for the regular repair of the pelvic floor.

Hegar's operation for cystocele. The redundant vaginal wall is removed over a large elliptical area. This denudation may be made by clipping off strips with the scissors as explained when speaking of denudation of the posterior wall (Figs. 502, 503, 512) or the mucosa of each side may be raised as a flap and then cut off as indicated in Fig. 522. The denudation should be wide, so that when the sides of the ellipse are brought together there will be some tension laterally, that a firm support from side to side may be formed under the base of the bladder.

The deeper portions of the area are closed by buried sutures and then the mucosa by superficial sutures, as indicated in Fig. 523. The sutures are all of catgut and may be made interrupted or continuous. The latter are preferable, as they save time.

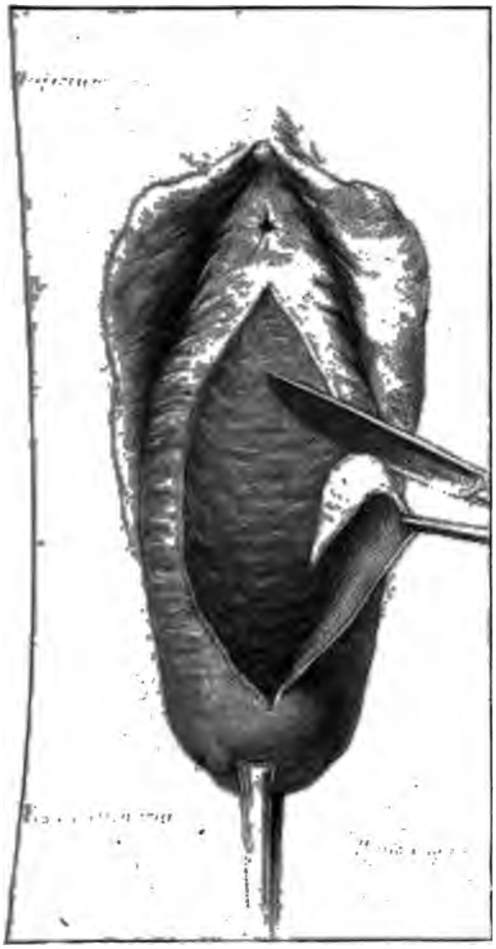


Fig. 522. **Hegar's Operation for Cystocele.** The vaginal mucosa raised and the redundant portions being excised. This shows also the area of Denudation. (Döderlein and Krönig—*Operative Gynakologie.*)

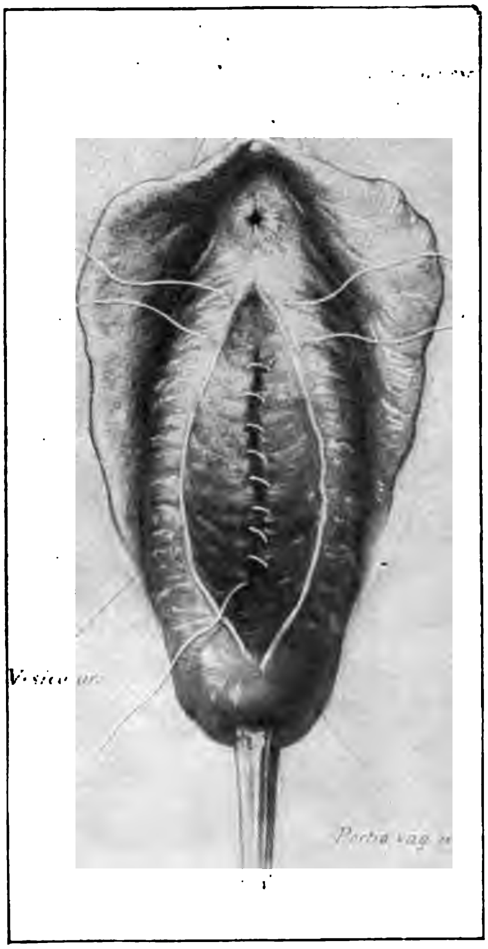


Fig. 523. Hegar's Operation for Cystocele. Showing the method of closing by deep and superficial sutures. Continuous sutures may be used for both deep and superficial if preferred. (Döderlein and Krönig—*Operative Gynakologie.*)

In the Hegar operation the lines of tension extend exclusively from side to side. There is no downward pull on the cervix, which is a serious disadvantage of the Stoltz operation ("purse-string" operation.)

RECTO-VAGINAL FISTULA.

From injuries in labor or from destructive ulceration or from other causes, fistulous openings may form, extending in various directions. The different varieties of genital fistulae, with the name given to each, are shown in Fig. 524.

A **recto-vaginal fistula** is an opening from the rectum into the vagina. The size of the fistula may vary from a small tortuous tract, admitting only a small probe and permitting only gas or fluid to escape, to a large opening, involving a large part of the recto-vaginal septum, and through which passes practically all the rectal contents.

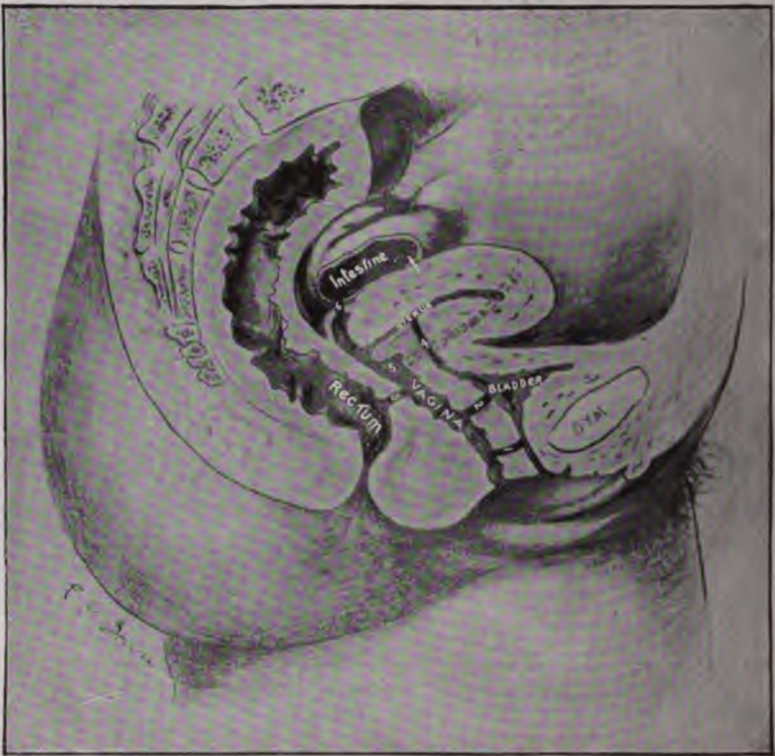


Fig. 524. Fistulae of the Genital Tract. 1. Urethro-vaginal fistula. 2. Vesico-vaginal fistula. 3. Recto-vaginal fistula. 4. Vesico-uterine fistula. 5. Uretero-vaginal fistula. 6. Intestino-vaginal fistula. (Gilliam—*Practical Gynecology*.)

Etiology and Pathology.

The following are the causes of recto-vaginal fistulae.

1. Injuries in labor. In rare cases a hole may be torn through the recto-vagin septum, resulting directly in a fistula. Usually, however, a fistula resulting fro labor, is due to a complete laceration of the perineum, which is repaired at once later, but fails to heal entirely. The lower part of the approximated surfaces unite, but a small part of the upper angle fails to heal, and the result is a fistula extending from the rectum into the vagina.

2. **Chronic ulceration** of the posterior vaginal wall, which may be chancroidal or syphilitic or tubercular. It usually affects the lower part of the vagina.

3. **Stricture of the rectum,** with dilatation and ulceration of the rectal wall above it.

4. **Malignant disease** of the recto-vaginal septum. This is usually secondary to cancer of the cervix uteri or cancer of the rectum.

5. **Operation.** A pelvic abscess which has ruptured into the rectum, will, if opened into from the vagina, give a recto-vaginal fistula. Again, in stricture of the rectum, there may be dilatation and ulceration of the rectal wall above the stricture with peri-rectal inflammation and an abscess. Such an abscess, if opened into from the vagina, will give a recto-vaginal fistula. Again, the rectal wall may be injured directly in various operations.

Diagnosis.

The diagnostic symptoms of recto-vaginal fistula, are the escape of some of the rectal contents into the vagina and the vaginal irritation caused by the same. The amount and character of the leakage from the rectum varies much in different cases. In the smallest fistulae, only gas with occasionally some liquid, passes. With the opening a little larger, there may be free leakage only when the bowels are loose and the contents fluid. In still other cases, nearly all the rectal contents, whether fluid or solid, pass through the fistulous opening.

Digital examination reveals a rough place in the posterior vaginal wall. If the opening is small, only a small elevation or depression or a rough place, is felt. On inspection, if the opening is large it may be seen, but if small only a rough place with a small slit is visible. Very often a red papule marks the vaginal opening of the fistula. Exploration of the opening with a probe, with a finger of the other hand in the rectum, shows that the sinus communicates with the rectum. In a doubtful case in which the opening cannot be found or in which a probe cannot be introduced, the fact that there is a recto-vaginal fistula may be established and its location determined by injecting colored water (methylene blue, $\frac{1}{5}$% solution) into the rectum and watching for its appearance on the posterior vaginal wall. If there is syphilitic or chancroidal or tubercular ulceration, or if there is a stricture of the rectum or malignant disease, the evidences of the complicating disease will be present, in addition to the evidences of fistula.

Treatment.

In the recto-vaginal fistula following labor, that is, where part of the repaired recto-vaginal septum failed to heal, no secondary operation should be undertaken for the closure of the fistula for six or eight weeks after labor. The fistula may close spontaneously within a few weeks. Again, an operation in the genital tract in the puerperium increases the chance of puerperal sepsis. Also, the patient is later in much better condition generally for the operation, as she has recovered from the debilitating effects of parturition. Locally, also, the tissues have returned to their normal condition, and complete primary union is much more certain to follow the operation. For sometime following labor the uterine discharge would tend to interfere with healing and the tissues are so friable that the sutures are much more liable to cut through.

Palliative treatment. In the meantime, the vagina must be kept clean by antiseptic vaginal douches, once, twice or three times daily, as indicated by the amount of leakage through the opening. If the opening is very small, stimulation by touching it occationally with silver nitrate stick or with carbolic acid, will sometimes cause the fistula to close. If the fistula persists after thorough recovery from the parturition, it may be closed by operation.

Operation.

In the simple form of fistula, without complicating ulceration or infiltration, the operation for closure may be undertaken without special local preparatory treatment.

The **preparation** of the patient, operator, instruments and dressings are the same as for repair of complete laceration of the pelvic floor.

Steps. The patient is placed in the dorsal posture and the fistula exposed by retractors or by the fingers of an assistant as is found most convenient. The sphincter ani muscle should be temporarily paralyzed by **stretching** before beginning the operation proper.

The vicinity of the fistula is then **denuded** as shown in Fig. 526. The denudation may be made with scissors or knife, as found most convenient. This removes all scar tissue along the fistulous tract and gives healthy denuded tissue for approximation. A large area should be denuded on the vaginal surface, and this as it goes deeper should slant gradually toward the point at which the fistula enters the rectum.

The opening in the rectum should not be made larger than is absolutely necessary to remove the hard scar-tissue from the opening and to denude the edges of the rectal mucosa, so that when these edges are brought together union will take place.

The **sutures** are passed as in Fig. 525. The needle enters the vaginal mucosa a short distance outside the area of denudation, passes to the bottom of the wound, is brought out in the denuded edge of the rectal mucous membrane, enters at a corresponding point on the opposite side and emerges from the vaginal mucosa. When this suture is tied it approximates the denuded area in the entire thickness of the vaginal wall and also the denuded edge of the rectal mucosa, but the suture does not touch the free surface of the rectal mucosa. It is important that the suture should not penertate to the interior of the rectum as the rectal contents might cause inflammation along its tract. The sutures are placed about one-fourth of an inch apart, and in such a way that when tied, the line of approximation lies in the long axis of the vagina. If desired, the deeper portions of the wound may be closed with buried catgut sutures, as explained under vesico-vaginal fistula (Fig. 526). A wider surface for approximation may be secured, without loss of tissue, by **splitting the edges** of the opening and approximating the raw surface of the rectal flaps by buried catgut, and approximating the raw surface of the vaginal flaps by catgut or silkworm-gut. In the fistula with a small rectal opening the above is the method of suturing to be employed.

When there is a large opening into the rectum, it may be necessary to close the opening in the rectal mucosa with a **separate row** of sutures passed from the rectal surface and tied in the rectum. In order to do this, it is necessary to dilate the sphincter ani widely so that the rectal end of the fistula may be reached for suturing. The denudation is made the same as previously described. The rectal sutures include only the rectal mucosa and a small amount of submucous tissue. After the opening in the rectal mucosa has been closed the remainder of the wound is closed by sutures from the vaginal surface as already described.

In a case of large fistulous opening near the anus, better approximation can be secured by dividing the tissues between the fistula and the anus, thus converting the fistula into a **complete laceration** of the perineum, which is then repaired in the ordinary way.

The after-treatment. The after-treatment of a case of recto-vaginal fistula is the same as after repair of complete laceration of the pelvic floor.

Special measures. In some cases there has been so much loss of tissue that the sides of the opening cannot be satisfactorily approximated. This marked loss of tissue may be due to extensive ulceration at the time the fistula was formed, or to repeated attempts at repair. In either case the vicinity of the opening is occupied by scar-tissue, extending in various directions and making the parts so rigid that the opening cannot be satisfactorily closed except by the employment of one of the following special measures.

1. Incisions of the vaginal mucous membrane some distance from the opening, to permit the mucosa being drawn over the opening without injurious tension. Each of these incisions, if made short, may be closed immediately by passing a suture in the long axis of the incision.
2. Transplantation of a flap of vaginal mucous membrane, the flap to receive its nourishment through an unsevered portion at one or both ends.
3. Detachment of the rectum from the fixed vagina, by incision in the perineum, and closure of the rectal wall independently of the vaginal wall. In certain cases of large recto-vaginal opening, the vaginal wall is bound immovably by scar-tissue and the sides of the rectal opening, are likewise held apart by their attachment to the vaginal wall. If a transverse incision be made in the perineum and the rectal wall dissected from the vaginal to a considerable distance above the fistula, it then becomes freely movable and the sides of the opening may be approximated. They should be united by one or two rows of sutures. The sutures may be passed from the opening in the vaginal wall or from the perineal wound, as found most convenient.

If the fistula is complicated by ulceration, the ulceration, of whatever character, should be healed as far as possible before the attempt is made to close the fistula. In some of these cases, the patient has tertiary syhpilis and needs a prolonged course of treatment for the ulceration and for the syphilitic deposit, and also for the marked anemia and generally lowered vitality that accompanies that disease.

In the syphilitic cases, if closure is attempted while the ulceration is still present or while the patient is anemic and weak from ulceration elsewhere, the operation is very liable to result in failure and the last opening may be larger than the first.

In a tubercular fistula and in a malignant fistula, it is useless to attempt closure of the fistula unless the infiltrated area can be excised and healthy tissue approximated by the sutures.

Other Fecal Fistulae.

Occasionally there occur other varieties of fecal fistula, opening into the genital tract. There may be an opening into the vagina from the sigmoid flexure or from the colon or from the small intestine. There may be an opening into the uterus from the sigmoid or from the colon or from the small intestine.

The most common form is that following some operation at the vaginal vault, particularly vaginal hysterectomy. It appears in the form of a small opening in the scar at the vaginal vault, from which intestinal gas or fluid escapes. It is caused by injury of the intestine during operation or by ulceration of the intestinal wall before or after operation. The injury may be caused by a bite of the bowel by the tip of the pressure-forceps,by a puncture of the bowel by a needle or ligature-carrier, by inclusion of a small portion of the bowel in a ligature as it is being tied or by partial or complete rupture of the bowel in breaking up adhesions. Sometimes a tubal abscess is discharging into the large or small intestine and, when such an abscess cavity is opened by vaginal incision, a fecal fistula results.

Fecal fistulae involving the vault of the vagina often close spontaneously after a few weeks, the vagina in the meantime being kept clean by antiseptic douches.

If the fistula persists after several weeks with no apparent prospect of closing it will be necessary to close it by an operation involving abdominal section or vaginal section. The character of the operation required will depend on the character of the fistula. It should be undertaken only by one skilled in pelvic surgery, for conditions very difficult to handle may be encountered.

The other forms of genito-intestinal fistula are rare, so rare that they are curiosities. They are due to special causes and require special treatment, usually involving abdominal section.

VESICO-VAGINAL FISTULA.

There may be an opening between the genital tract and the urinary tract at one of several situations (Fig. 524). The location is indicated by the name as follows:

Urethro-vaginal fistula—between urethra and vagina.
Vesico-vaginal fistula—between bladder and vagina.
Uretero-vaginal fistula—between ureter and vagina.
Vesico-uterine fistula—between bladder and uterus.
Uretero-uterine fistula—between ureter and uterus.

All of these fistulae are rare, the most common being the vesico-vaginal. A vesico-vaginal fistula is an opening from the bladder into the vagina. The size of the fistula may vary from a small opening, permitting only slight leakage, to a large opening through which all the urine passes.

Etiology.

The following are the causes of the vesico-vaginal fistula:

1. **Injuries in labor.** In prolonged labor where the lower portion of the bladder is caught and held for several hours between the head and the pubic bone, sloughing may follow. Part of the base of the bladder and the anterior vaginal wall are bruised, the circulation is more or less cut off, the parts become gangrenous and after a few days the slough separates, leaving a vesico-vaginal opening through which the urine passes. Such injuries are rare in recent years on account of the great improvement in obstetric teaching and practice. Now, the head is not permitted to remain for several hours in such a position that it makes serious pressure on the bladder. If the head does not advance satisfactorily within a reasonable time after the rupture of the membranes, the child is delivered by forceps or otherwise.

A still rarer form of damage to the bladder in labor is that in which the bladder is torn directly, either by the manipulations incident to a version or by the forceps. In that case the dribbling of urine is noticed immediately, or within a few hours after labor, whereas if the fistula is due to sloughing, there is no escape of urine until the separation of the slough, which requires several days.

2. **Chronic ulceration** of the anterior vaginal wall or the base of the bladder. The ulceration may be chancroidal, syphilitic or tubercular.

3. **Malignant disease** of the vesico-vaginal septum. This is usualy secondary to cancer of the cervix uteri.

4. **Operations.** One of the methods of treating severe chronic cystitis is to make an opening from the vagina into the base of the bladder, so as to give constant drainage of the latter. Such an opening usualy closes spontaneously a short time after the drainage tube is removed. It may, however, fail to close promptly after its usefulness is ended, and in that case becomes a vesico-vaginal fistula, requiring operation.

Diagnosis.

The patient complains of urine coming from the vagina and of much vaginal irritation. In some cases the patient complains simply that she cannot control the urine.

Digital examination reveals a rough place on the anterior vaginal wall. If the opening is large it may be distinctly made out with the finger. If the opening is small, only a slight elevation or depression or rough place may be felt. Upon inspection, if the opening is large, it may be seen, but if it is small, only a rough place with a small slit is visible. Very often a red papule marks the vagnial opening of the fistula. Exploration of the opening with a probe, with a sound in the bladder, shows that the sinus communicates with the bladder. If the opening be watched a few minutes, urine may be seen escaping from it. If the diagnosis is doubtful sterile methylene-blue solution may be injected into the bladder and its appearance watched for at the supposed vaginal opening of the fistula. There is a rare condition which must be carefully differentiated from vesico-vaginal fistula, namely, uretero-vaginal fistula.

When the vesico-vaginal opening is large, the fact that it communicates with the bladder is apparent, and frequently the margins of the opening and the adjacent surfaces of the vaginal mucosa and vesical mucosa are encrusted with the phosphates from the decomposed urine. In one of my cases there was a large phosphate stone nearly filling the contracted bladder and projecting through the large vesico-vaginal opening into the vagina.

The irritation caused by the decomposition of urine in the vagina is very great, and the constant odor of decomposing urine combined with the constant leakage of fluid, soaking pads and clothing, makes the patient's very existence a burden to her.

Treatment.

If the fistula is due to malignant disease, no attempt should be made to close it unless the malignant infiltration is so situated that it can be completely extirpated. In the inoperable cases, local cleanliness and local sedatives are indicated.

If the fistula has resulted from sloughing after labor, it is best to postpone the operation for repair for at least eight weeks, until the patient has fully recovered from parturition and the tissues have become strong enough to hold the sutures well. During the time the patient is waiting, palliative treatment will be necessary.

Palliative Treatment. This consists in keeping the parts clean and in receiving and disposing of the urine, so that it does not come in contact with the clothing. To accomplish the first object, a urinary antiseptic such as urotropin should be given internally. Also a vaginal douche of borax (a tablespoonful to a quart of water) or a weak carbolic douche (½%) should be given two or three times daily and the external genitals should be washed frequently with a carbolic wash. If there is much vulvar irritation, the measures mentioned under acute vulvitis may be employed. For catching the urine and protecting the clothing, one of the urinals found in the instrument-stores may be used. If no satisfactory urinal can be obtained, an absorbent cotton pad covered with a large piece of rubber-sheeting may be used. The piece of rubber-sheeting is held in place by a suitable bandage and the pad is changed as frequently as it becomes wet, so that no leakage into the clothing takes place. All the surfaces with which the urine comes in contact may be coated twice daily with benzoated zinc-oxide ointment.

If the fistula is very small, cauterization may aid spontaneous closure. The vaginal portion of the fistulous tract may be cocainized and then touched with carbolic acid or nitric acid. An occasional stimulation with the silver nitrate stick is sometimes useful. If after the patient has recovered from parturition, the fistula shows no evidence of early closing, an operation is indicated.

Operation.

In an operative case of vesico-vaginal fistula the preparatory measures are important. The object is to secure a healthy condition of the edges of the fistulous opening. These edges are often inflamed and covered with phosphatic deposits. These deposits should be removed with cotton and the raw surfaces brushed with silver nitrate solution (2% to 4%) or some of the other silver preparations. If the deposits adhere to the mucous membrane and are difficult to remove, they may be dissolved by the application of a weak nitric acid solution (one or two drops to the ounce). Frequent hot vaginal douches of plain water or borax solution or weak carbolic solution, are beneficial, as are also frequent warm sitz-baths. After the douches and sitz-baths the patient should dry the parts as best she can and then apply the zinc oxide ointment over all the surfaces, to prevent contact with the urine.

Every second or third day the physician may introduce the Sims speculum, cleanse the parts thoroughly, apply the silver preparation and then coat the vaginal walls and adjacent surfaces with benzoated zinc-oxide ointment or other suitable protective.

The urine may be made more acid and the tendency to phosphatic deposits thus diminished, by giving the benzoic acid mixture recommended by Emmet (see Formulae). After a few days, when the urine is strongly acid and shows but little tendency to decomposition, the dose of the benzoic acid mixture may be reduced from a tablespoonful to a teaspoonful, as the larger dose may produce gastric irritability. This urinary antiseptic or some similar one should be continued after operation to prevent phosphatic deposit about the bladder wound. Also, a large amount of pure water should be given to keep the urine will diluted.

The same general preparation of the patient for operation should be carried out as for repair of laceration of the pelvic floor. Special attention must be given the urine. For several days before operation the patient should be given some urinary antiseptic every six or eight hours, such as the benzoic acid mixture, just mentioned, or cystogen or urotropin or salol and boric acid.

A specimen of urine for analysis may be obtained by cleansing the vagina and then placing a bed-pan under the patient long enough to collect a sufficient quantity.

Before operation it must be determined that the urethra is not closed by shrinkage from non-use and inflammatory adhesions. In some cases no urine has passed through the urethra for months or years. If the urethra is not of proper calibre it should be dilated during the preparatory treatment.

The technique of the operation for vesico-vaginal fistulae is indissolubly connected with the name of J. Marion Sims. The rise of Sims to great prominence was due largely to his admirable work in these cases. Up to his time the severer grades of vesico-vaginal fistula were considered incurable, and every such patient was consigned to life-long misery a burden to herself and to her associates. Extensive vesico-vaginal fistula following labor was much more common then than it is now, for obstetric teaching had not then advanced to its present state. Consequently there were many patients in the various countries of the world suffering from the severer forms of this trouble, and all were practically without hope of relief.

Sims took hold of the subject and perfected the means for exposing the fistula—Sim's speculum and Sim's posture—and also the instruments and technique for suturing with silver wire. He also provided for constant drainage of the bladder during healing, by the use of a retention catheter.

These improvements together with his tactile skill, his painstaking care and his courageous perseverance, enabled him to obtain results that were before considered impossible. Apparently hopeless cases were made well, patients were restored from a miserable existence to a happy life and eventually the fame of Sims spread everywhere in the civilized world—and history justly records him as one of the great leaders in medical progress and one of the great benefactors of mankind. He made many other advances in the treatment of diseases of women, but none so striking and complete as in vesico-vaginal fistula. The silver wire sutures and the instruments used by Sims in their application, still hold their place with some operators, though most operators now prefer the silkworm-gut sutures or buried cat-gut sutures. In some cases the Sims posture and the Sims speculum give the best exposure of the field for operation, but in most cases the operation can be more quickly and satisfactorily carried out with the patient in the exaggerated lithotomy posture, otherwise known as the Simon posture.

Steps. After satisfactory exposure of the fistulous opening, the edges are pared as shown in Fig. 526. A small sharp knife or curved scissors may be used, as found most convenient. A very good plan is to outline the area to be denuded with a knife, so as to give it an even margin, and then excise the tissue with the scissors. The denudation is made extensive on the vaginal surface and slopes inward toward the bladder opening. The denudation must be carried into sound tissue so that primary union may take place.

When possible the denudation should be made in such a way that the line of union can be made to lie somewhat in the long axis of the vagina. That is preferable for the reason that it causes less disturbance of the pelvic relations. When the line of union extends crosswise of the vagina, the antero-posterior tension tends to drag the cervix downward and cause retroversion. The fistula should be closed, however, in the way that will permit accurate approximation without injurious tension. In case the opening is round, a V-shaped denudation may be made at each end to permit accurate approximation in a straight line without too much tension. If necessary the edges may be brought together in the shape of an X or a Y.

The oozing of blood may be largely checked by the application of a small cotton or gauze sponge wrung out of very hot water, or by irrigating with hot water. The denudation should not extend into the vesicle mucosa as it may start bleeding, that may continue to prove troublesome even after the suture are passed and tied. In some cases, after such operation, blood clots have formed in the bladder to such an extent that the wound had to be reopened.

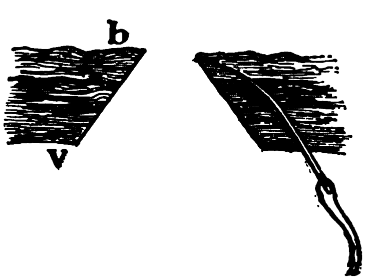


Fig. 525. The Course of the Needle in suturing a vesico-vaginal fistula. v. Vaginal surface. b. Bladder surface. The needle passes to, but does not include, the bladder mucosa. (Skene—*Diseases of Women.*)

The **sutures** are passed as shown in Fig. 525. They enter the vaginal mucosa $\frac{1}{4}$ to $\frac{1}{2}$ an inch from the margin of the denuded area, pass into the bladder sub-mucosa, emerge near the bottom of the denuded area and then pass through corresponding tissues on the opposite side of the wound. They do not appear on the vesical surface.

The sutures are passed at intervals of about one-fourth of an inch. They may consist of silkworm-gut or of 20-day catgut. After the sutures are passed the bladder should be washed out before they are tied, to wash out all blood from it. The sutures are then tied and cut, and, if desired, the bladder may be filled with boric acid solution (3%) to see if there is any leakage.

It is preferable in most cases to first close the deeper portions of the wound with buried sutures, as shown in Fig. 526.

A very useful expedient, especially when there is much loss of tissue and decided tension in bringing the sides together, is to incise the vaginal surface around the fistula, as shown in Fig. 527, and then turn in the edges without cutting any off. The raw surfaces of the turned-in flaps are sutured together by buried sutures (Fig. 528) and then the vaginal mucosa is closed over by continuous or interrupted suture as desired (Fig. 528).

After the fistula is sutured, a light packing of antiseptic gauze is placed in the vagina, the soft-rubber retention catheter is introduced, if it is to be used, a dressing is applied over the vulva and the patient is put to bed.

The **after-treatment** is the same as after repair of laceration of the pelvic floor, with the addition of frequent catheterization or constant bladder drainage by means of the retention catheter. When the retention catheter is used, it is left in from three to eight days, depending on the case, and after that the patient urinates or is catheterized every six hours until the wound is firmly healed.

If preferred, the bladder may be emptied by catheter every three to six hours for the first two or three days, the retention catheter being thus entirely dispensed with. With a reliable trained nurse in attendance, the frequent catheterization is fairly safe, but without such an attendant, the retention catheter is safer. When it is used it should be removed and sterilized each day and the bladder washed out with boric acid solution (3%). It is well to leave the catheter out for an hour or two for a change. As long as catheterization is necessary, the bladder should be washed out with boric acid solution (3%) either once of twice daily or after each catheterization. When the retention catheter is in place, the patient may lie in the prone or semi-prone posture to favor drainage. In severe cases it may be advisable to keep her in this posture most of the time, until the opening is healed.

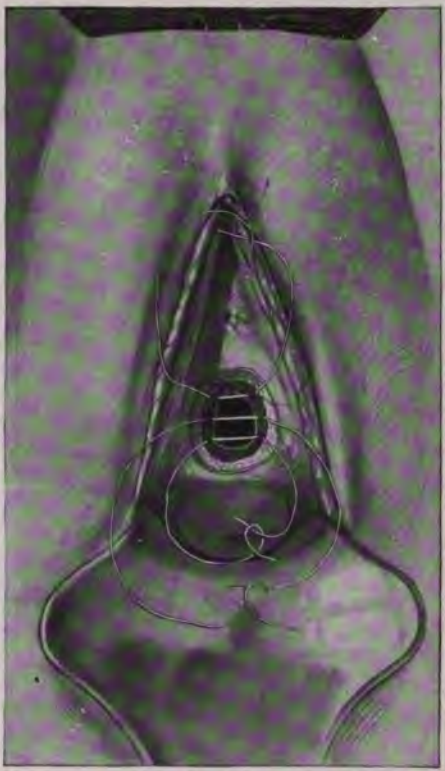


Fig. 526. The Regular Operation for Vesico-vaginal Fistula. Showing the area of Denudation and also the Deep Sutures. (Montgomery—*Practical Gynecology*.)

In mild cases, no special care is necessary except to administer the urinary antiseptic and to see that the bladder is emptied every four to six hours, either spontaneously or by catheter.

The sutures are removed in twelve to fifteen days.

Special measures. There are various special measures required by special conditions.

In cases in which there are bands of scar-tissue in the vagina, which hold the edges of the fistula apart, it is sometimes advantageous to divide these bands in the preliminary treatment, and separate the divided bands widely by a glass plug.

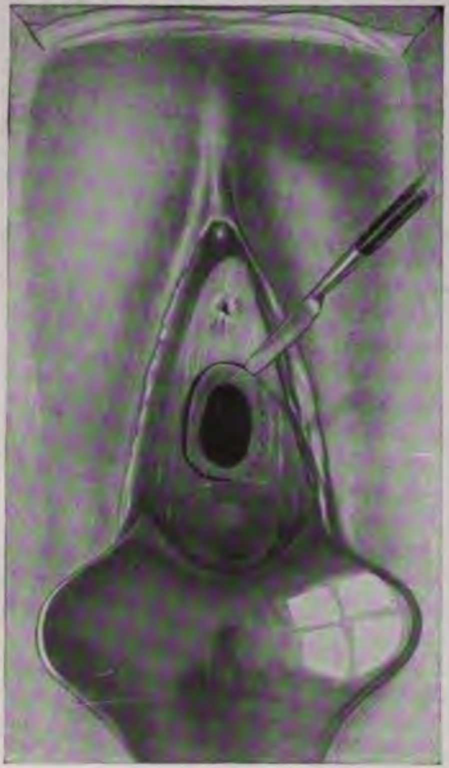


Fig. 527. The Flap Operation for Vesico-vaginal Fistula. Making the Incision for turning in the flap. The "flap operation" is especially useful where there has been loss of tissue. (Montgomery—*Practical Gynecology.*)

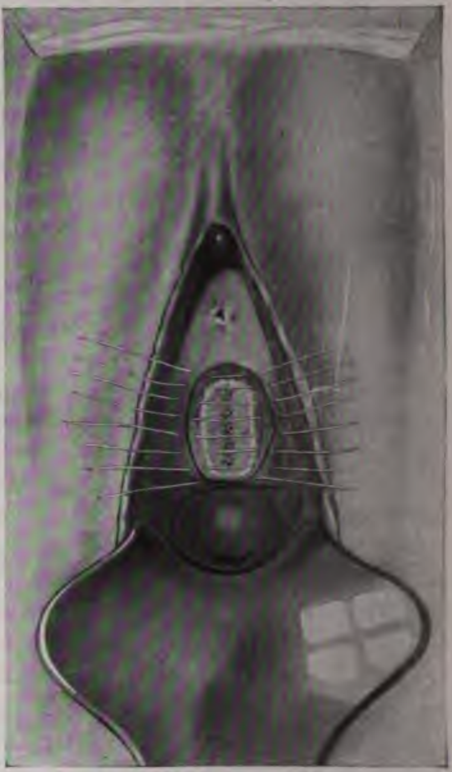


Fig. 528. The Flap Operation for Vesico-vaginal Fistula. The flap has been turned in and the Deep Sutures passed and tied. The Superficial Sutures also are in place. If preferred, continuous sutures may be used throughout. (Montgomery—*Practical Gynecology.*)

In severe cases, there is danger of occlusion of a ureter, by a ligature or by an opposing surface. This accident is indicated by increasing pain in the region of one kidney and along the ureter, accompanied by a decided diminution in the amount of urine secreted. It requires the removal of one or more sutures. To prevent occlusion of the ureter a cystoscopic examination should be made whenever the position of the fistula is such as to make it probable that one of the ureters enters it or lies close to it. By cystoscopic examination, the ureteral opening may be located and, if it is dangerously near the fistula, a ureteral catheter may be introduced, that the ureter may be better located during the operation and avoided.

In the severer cases, where there is much loss of tissue and scar contraction, it may be necessary to employ one or more of the special measures mentioned under recto-vaginal fistula, such as remote incisions of the vaginal mucous membrane or transplantation of flaps of the mucosa. There are other special measures that are useful in certain cases, such as the following:

a. Separation of the bladder wall from the uterus and upper part of the vagina, sufficiently to permit its being pulled down and sutured to the lower edge of the opening without much tension.

b. Drainage of the bladder by suprapubic cystotomy. Satisfactory drainage can usually be secured with a retention catheter in the urethra. In certain cases however the neck of the bladder, and consequently part of the urethra, is in the damaged area and is necessarily involved in the operative work. In such a case, if a catheter be left in the urethra, the tissues in the neck of the bladder immediately about the catheter, fail to heal, resulting in incontinence of urine. In such a case, the bladder may be drained and kept at rest by suprapubic cystotomy and constant drainage. Another method of dealing with these cases is to make the operation in two stages—repairing first the urethral injury and draining the bladder by the fistula, and later closing the fistula and using the urethra for drainage.

The difficulties of operation vary much in different cases. A small vesico-vaginal fistula is easily repaired and usually heals without trouble. In the case of a large fistula in which the edges can be easily brought together with tenacula, or can be brought so near together that lateral incisions will permit perfect approximation, there is but little difficulty for an experienced operator. It requires considerable experience in plastic surgery to be able to judge in some cases before an operation whether or not such approximation can be secured. If it cannot be secured some other measure must be adopted and planned for in detail, before the day of operation.

In some cases, with the best of care, two or three operations may be required to effect a cure, the fistulous opening being decidedly reduced in size with each operation. But the operator must have a clear understanding of what is to be accomplished in that particular case by each operation. As Kelly remarks in his admirable work: "It is worse than useless to denude the edges of a large fistula, without having any definite idea of what can be accomplished until the stitches are put in and pulled upon. It would be far better to let the patient entirely alone, and confess honestly an inability to relieve her, than to go on cutting away valuable tissue and increasing the size of the fistula every time, with a vague idea that by some chance the operation may succeed."

There are cases of vesico-vaginal fistula presenting a contracted bladder and with scar-tissue extending in various directions binding the edges of the fistula to adjacent bones, that tax to the utmost the skill and ingenuity of the operator, who must devise some way of bringing the urinary stream within control of the sphincter vesicae and of providing a bladder-cavity large enough to hold a few hours urine.

Other Urinary Fistulæ.

Occasionally there occur other varieties of urinary fistulæ, opening into the genital tract. There may be an opening into the vagina from the ureter of one or both sides, or there may be an opening into the cervix uteri from the bladder or from the ureter.

The usual causes of these fistulæ are severe laceration of the cervix in labor or some operation at the vaginal vault. The fistula appears as a small opening in the scar-tissue, from which urine escapes. If due to injury during operation, the injury may have been caused by a tear of the bladder wall while separating it from the uterus, by a bite of a ureter or the bladder by the tip of a pressure-forceps, by a puncture of a ureter or the bladder by a ligature-carrier, or by inclusion of a ureter in a ligature.

When due to an injury during labor, the vesico-uterine fistula is caused by a severe laceration of the cervix extending up into the vaginal vault and through the bladder wall. The lower portion of the cervical wound heals, but the upper part communicating with the bladder fails to heal, and there is left an opening from the bladder into the cervical canal.

In the ureteral fistulæ, if one ureter only is involved, there will be leaking of urine into the vagina and at the same time urine from the other ureter will be received and contained in the bladder and passed normally. If both ureters are involved, all the urine will pass into the vagina and none into the bladder. In either case, if methylene-blue solution be injected into the bladder, none of it will pass through into the vagina. When the fistula is connected with a ureter, the urine comes in little gushes at intervals of several seconds.

The vesico-uterine and uretero-uterine fistulæ are indicated by the escape of urine from the cervical canal. Colored water injected into the bladder comes out of the cervical canal if the fistula is connected with the bladder, but not if it is connected with the ureter.

These fistulæ at the vault of the vagina often close spontaneously after a few weeks, the vagina in the meantime being kept clean by frequent antiseptic douches. If a fistula persists after several weeks with no apparent prospect of closing, it will be necessary to close it by operation. Occasionally the fistula may be closed by a small operation, for example, in the vesico-uterine fistula if the fistula is near the free margin of the cervix, the cervix may be split up to the fistula, the infiltrated margins of the fistula excised, and the whole area closed, much the same as an ordinary cervical laceration, with the addition of a few extra sutures for the bladder wall. If the fistulous tract is situated high in the cervix the operation will involve separation of the bladder from the uterus and separate closure of the two wounds. This may be carried out through vaginal dissection or by abdominal section, as found most convenient. The majority of fistulæ at the vaginal vault require rather extensive operative procedures, vaginal or abdominal (depending upon the character and location of the fistula), and in most cases the procedures can be carried out satisfactorily only by one familiar with pelvic and abdominal operative work. Occasionally nephrectomy is advisable, to stop the continuous leakage of urine from a ureteral fistula that cannot be repaired.

Destruction of Urethra.

The condition to which I refer here is destruction of the urethra by ulceration beginning in the vestibule and extending upward to the bladder. The urethra is destroyed as far as function is concerned and there remains simply an opening from the bladder to the external genitals, through which the urine constantly dribbles.

The destructive ulceration is called syphilitic. The treatment is to restore the urethra by a plastic operation. The cases often prove very rebellious to operative treatment, it being particularly difficult to secure restoration of the sphincter function. The cause, course and effective treatment of this troublesome affection are given in detail in a paper* which I read before the St. Louis Obstetrical and Gynecological Society.

Partial Incontinence of Urine.

Some patients complain of inability to control the urine when coughing, laughing, etc. Others find the urine begins to escape when the bladder reaches a certain fulness. Still others find difficulty in retaining the urine when weakened by sickness or when very tired. This is found especially in patients past the menopause.

In all such cases the weakness is due to weakness of the sphincter vesicae. This weakness is due in most cases to stretching and injury at childbirth. The tissues in front of the vaginal opening are usually stretched considerably during childbirth and in some cases very much. Ordinarily this stretching is recovered from sufficiently to restore complete control, though the urethra is usually larger than before. In some cases the tone of the sphincter is not recovered and consequently there is not complete control of the urine. In some cases, though the tone is not fully recovered, the patient is able to control the urine, until the muscular atrophy of old age comes on. It is the latter factor that makes this of such frequent occurrence in the aged.

The treatment is to strengthen the sphincter vesicae. This is accomplished by excising a wedge-shaped piece of tissue in the region of the sphincter vesicae. This includes vaginal wall and underlying tissues but should not extend into the urethral canal. The tissues are then brought together and piled up by sutures, buried and otherwise. In many of these cases there is also cystocele and relaxed pelvic floor, both of which conditions should be thoroughly repaired. This plan has given me much satisfaction in the treatment of this very annoying affection. In inoperable cases, relief may sometimes be given by a specially adjusted pessary.

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*A Vesico-Vaginal Opening as a means of Bladder Drainage in Extensive Plastic Work on the Urethra, by H. S. Crossen, M. D. American Journal of Obstetrics, 1899.

CHAPTER VI.

DISEASES OF THE UTERUS.

POINTS IN ANATOMY.

The uterus is situated about the center of the pelvic cavity, between the bladder and the rectum (Figs. 1, 3, 593). It projects upward into the lower part of the peritoneal cavity, and its convex surface, except the lower portion, is enveloped by peritoneum. The upper end of the uterus is directed forward. The lower end is directed backward and downward and projects into the upper end of the vagina. The uterus is freely movable, especially the upper portion, and may be pushed backward by a full bladder or forward by a full rectum.

The uterus is shaped somewhat like an inverted pear (Figs. 529, 530, 531). Its lower constricted portion is called the cervix uteri (neck of the uterus) and to this the vagina is attached. The remainder of the organ is called the corpus uteri (body of the uterus). It is from the upper portion of the uterus, the widest portion, that the Fallopian tubes arise. That portion of the uterus lying above the Fallopian tubes is known as the fundus uteri (Fig. 531).

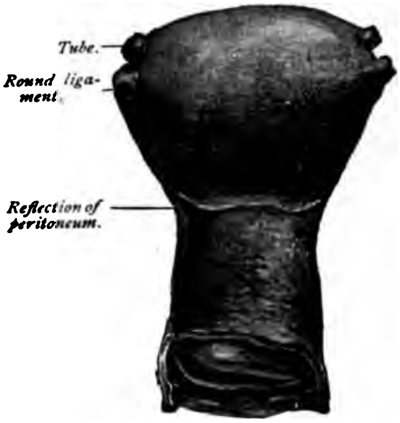

Fig. 529. Anterior View of the Uterus. (Dickinson—*American Text-book of Obstetrics.*)

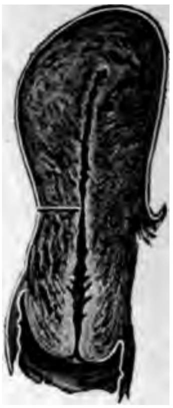

Fig. 530. Antero-posterior Section of Uterus showing walls and cavity. (Dickinson—*American Text-book of Obstetrics.*)

The uterus has a small central cavity (Figs. 531, 532) which is lined with mucous membrane and which communicates through the vagina with the outside world and through the Fallopian tubes with the peritoneal cavity (Fig. 628). This is the only continuous opening from the outside of the body into the peritoneal sac, and it is because of this direct opening into the peritonael cavity that peritonitis is so much more frequent in women than in men.

The **size** of the uterus is of course different in the different periods of life (Figs.

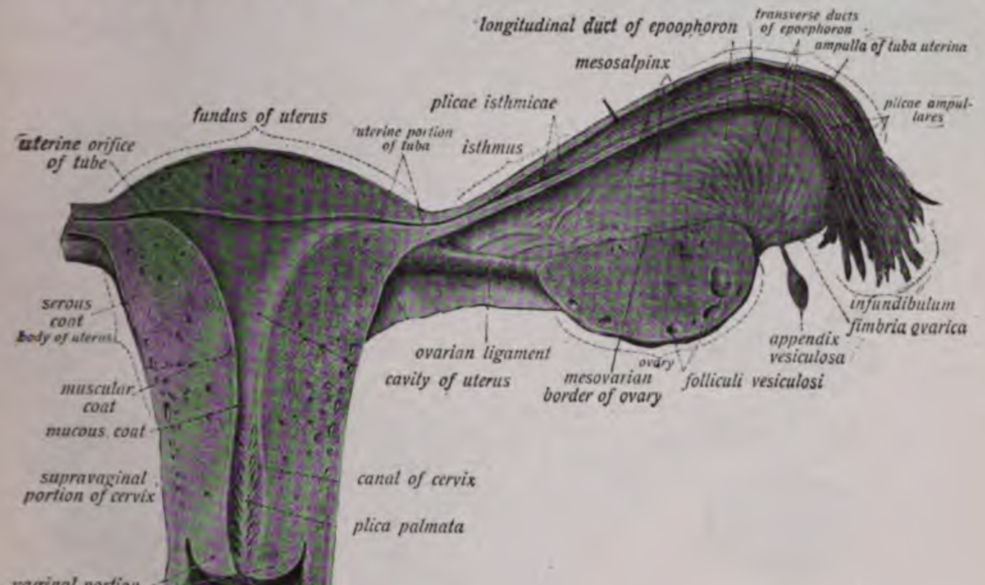

Fig. 531. **The Uterus** and the Right Fallopian Tube and the Right Ovary, laid open. View from behind. In **the right lower corner,** an Antero-posterior Section of the Uterus is shown. (Sobotta and McMurrich—*Human Anatomy.*)

533, 534, 535). **At birth** it is a trifle over one inch long and the cervix comprises two-thirds of the organ (Fig. 536). It is important to keep in mind the peculiarities of the infantile uterus, for occasionallly an adult presents a uterus some-hat infantile and accompanied with troublesome symptoms due to lack of de-elopment. A rather common condition and a very troublesome one (see dysmen-rrhoea) is a sharp anteflexion of the cervix—the corpus uteri being in practically ormal position, but the cervix being flexed sharply forward and directed along e vaginal canal toward the opening. In the fetus, the uterus lies very high and

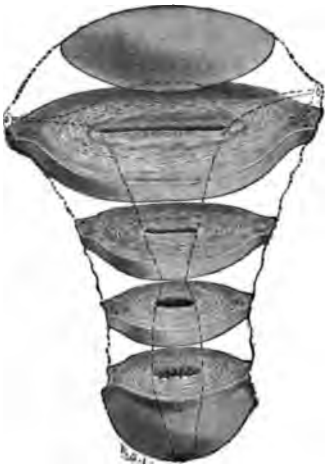

Fig. 532. Reconstruction of the uterus, showing the shape of the cavity. (Williams—*Obstetrics.*)

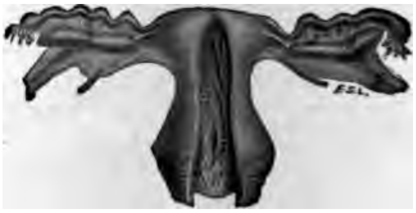

Fig. 533. Uterus and Appendages of a Young Child. (Williams—*Obstetrics.*)

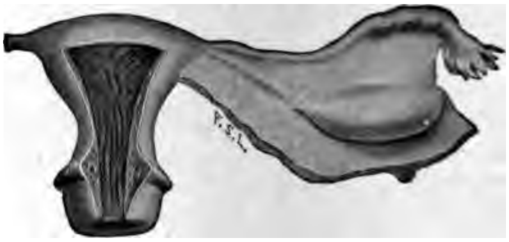

Fig. 534. Uterus and Tube and Ovary of a Fourteen-year-old Girl. (Williams—*Obstetrics.*)

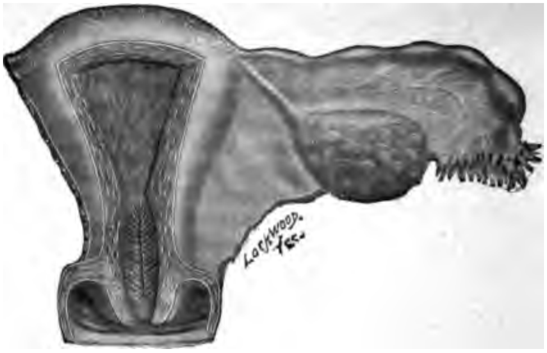

Fig. 535. Uterus and Tube and Ovary of a Twenty-year-old Mutipara. (Williams—*Obstetrics.*)

he cervix is very large. At first the axis of the cervix lies almost in the axis of he vagina, as shown in Fig. 536. Normally, as development progresses, the orpus uteri gradually comes forward and the cervix becomes directed somewhat ackward, across the vaginal axis, as shown in Fig. 537. In the cases of imperfect evelopment above referred to, the corpus uteri comes forward normally but the

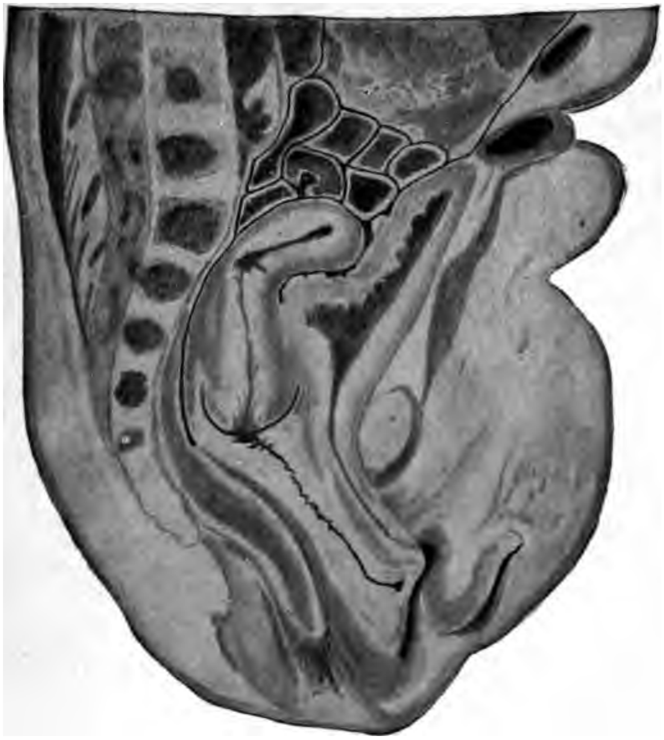

Fig. 536. Vertical mesial section of the pelvis of a large fetus at time of birth. (Webster—*Diseases of Women.*)

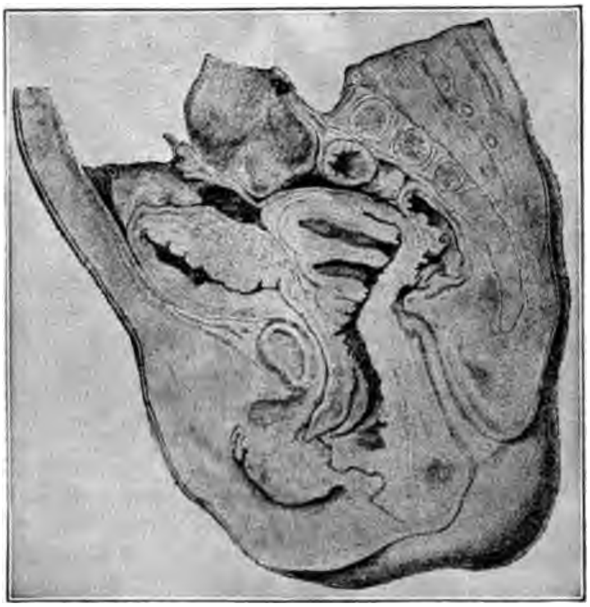

Fig. 537. Antero-posterior section of the pelvis of an infant. (Tait—*Gynecology and Abdominal Surgery.*)

cervix fails to assume its backward direction—remaining **in practically the fetal** position (directed along the axis of the vagina) and causing a sharp " anteflexion of the cervix" (Fig. 330).

The **adult virgin** uterus is three inches long (cavity $2\frac{1}{2}$ inches) and the cervix forms one-third of the organ. The transverse measurement at the widest part is one and a half to two inches, and the average thickness is one inch. It weighs an ounce to an ounce and a half. After **childbirth** the uterus is always a little larger than the virgin uterus (Fig. 538). This is the kind most frequently requiring examination. The cavity measures two and one-half to three inches. After the **menopause** there is marked atrophy of all the genital organs, including the uterus. The extent of the atrophy of the uterus is variable. In the very aged it may be reduced to a nodule the size of the end of the thumb, and the cervix then no longer projects into the vaginal cavity, but is felt simply as an indurated area, with a small central opening, situated in the upper part of the anterior vaginal wall.

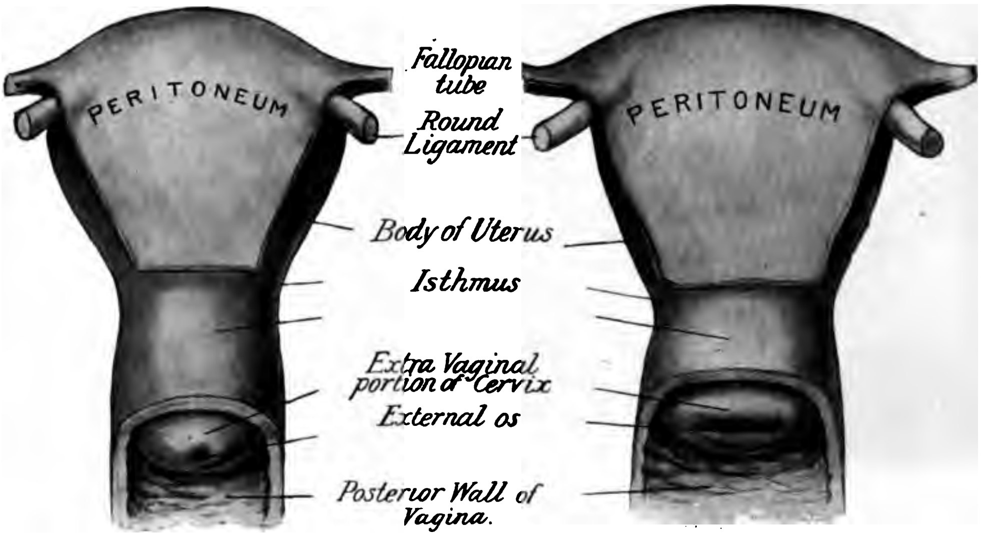

Fig. 538. A Comparison of the Nulliparous Uterus with the Multiparous Uterus. (Edgar—*Practice of Obstetrics.*)

Structure of the Uterus.

The uterus is a hollow muscle. The central cavity is lined with mucous membrane while the external surface of the muscle is covered with peritoneum. The wall of the uterus is therefore composed of three layers—peritoneal muscular, and mucous (Figs. 530, 531).

1. Peritoneal layer. This forms a delicate serous covering to the uterus. It does not differ materially from peritoneum elsewhere. There are certain portions of the uterus which are not covered by peritoneum, namely, the lateral portions of the body and the front and sides of the cervix (Fig. 539).

2. **Muscular layer.** This is the real wall of the uterus. It is ½ to ¾ of an inch thick and is composed of involuntary muscular tissue. Under the microscope, the principal elements are seen to be the long muscle cells. They are fusiform in shape and are arranged in parallel rows. These rows of muscle cells are arranged in bundles that extend in various directions.

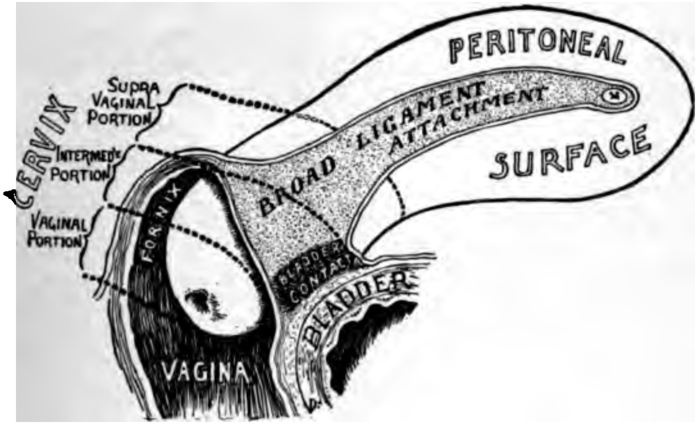

Fig. 539. Showing the Relations of the Uterus to the Vagina and Bladder and Peritoneum. (Dickinson—*American Text-book of Obstetrics.*)

[illegible] **[illegible]scular wall of the uterus is divided somewhat into strata.** In the unim[illegible] uterus the different strata are not clearly defined, but, speaking in a [illegible]y, it may be said that the muscular bundles are arranged in three strata [illegible]uter longitudinal stratum, a thick middle stratum of interlocking bundles in various directions, and a thin inner longitudinal stratum.

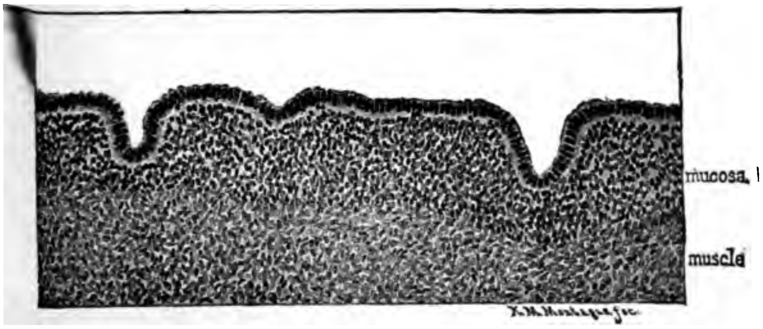

Fig. 540. Endometrium of an infant, just born. (Williams—*Obstetrics.*)

The **connective tissue** of the muscular layer comprises most of the connective tissue of the uterus. It is not distributed in the form of distinct strata, but appears as irregular masses surrounding and supporting the important elements. There is a very intimate connection between the mucous membrane lining the uterus and the connective tissue of the muscular layer.

The **blood vessels** of the muscular layer include most of the vessels of the uterine wall. The arteries are distinguished in a microscopic section, by their thick walls and folded intima. The outer vessels run in a longitudinal direction, while the inner vessels run perpendicular to the mucous surface. There is a dense capillary network close to the mucous membrane.

The veins are very large and have thin walls.

The **lymphatics** of all the coats of the uterus (peritoneal, muscular and mucous) empty into large lymphatic vessels in the external muscular stratum. These in turn empty into efferent trunks at the sides of the uterus.

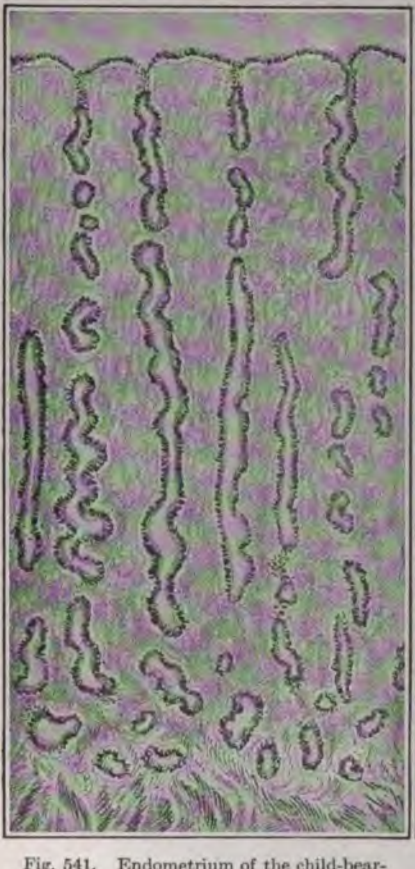

Fig. 541. Endometrium of the child-bearing period. This specimen is from a woman aged 25 years. (Dudley—*Practice of Gynecology*.)

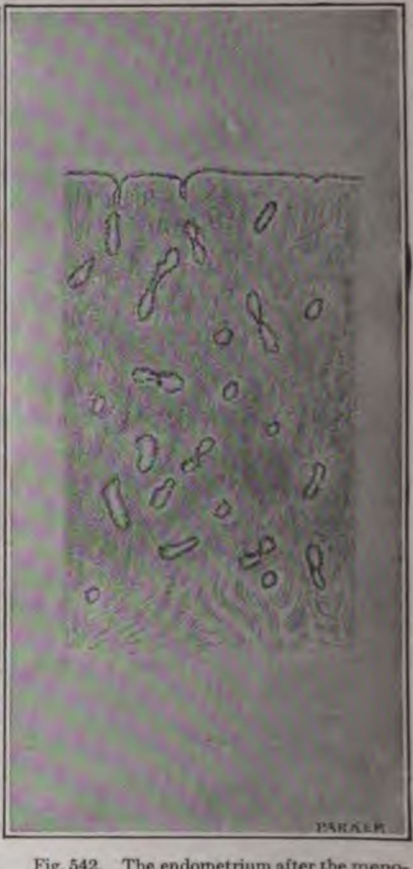

Fig. 542. The endometrium after the menopause. Notice the diminution in thickness and the scarcity of the glands. Both specimens are magnified to the same extent. (Dudley—*Practice of Gynecology*.)

The **nerves** of the muscular layer are derived from the sympathetic. The filaments ramify among the muscular bundles and terminate in the nuclei of the muscle cells.

3. Mucous layer. The mucous membrane of the uterus lies directly on the *internal* muscular stratum, the usual submucous layer of loose connective tissue being absent. Scattered muscular filaments extend into the mucosa, so the connection between the two is firm. The mucous membrane of the body of the uterus is known as the "endometrium." That lining the cervix is known as the "cervical mucosa."

The **endometrium** is about $\frac{1}{25}$ of an inch thick in the child-bearing period, and is disposed over the interior of the uterus as a smooth layer (Fig. 531, 568). It is soft and velvety to the touch, and when perfectly fresh has a pink color. Most of the specimens seen some hours after removal of the uterus have a grayish appearance, indicating a beginning post-mortem change. There is a great difference in the thickness and general appearance of the endometrium in the different periods of life. The endometrium in early childhood is shown in Fig. 540, in adult life (child-bearing period) in Fig. 541, and after the menopause in Fig. 542.

The basis of the endometrium is a tissue composed almost exclusively of oval cells, somewhat larger than a leucocyte and having a round or oval nucleus that stains lightly (Fig. 543). The nucleous is so large that it occupies most of the cell (Fig. 543). When stained it is reticular, i. e., it shows the chromatin bands and does not stain a solid dark color as does the nucleus of a lymphocyte. These oval cells with the large reticular nucleus are known as **stroma cells.** They are packed closely together, with nothing separating them except a few cell processes and a small amount of serous or mucoid inter-cellular substance. The tissue thus formed is known as **cytogenic tissue.** When a specimen of it is stained, the microscopic field seems to be almost entirely occupied by rounded or oval reticular nuclei (Fig. 543). The cell-protoplasm stains so lightly and is so small in amount that it is scarcely noticeable. The stroma cells may vary slightly in size and shape

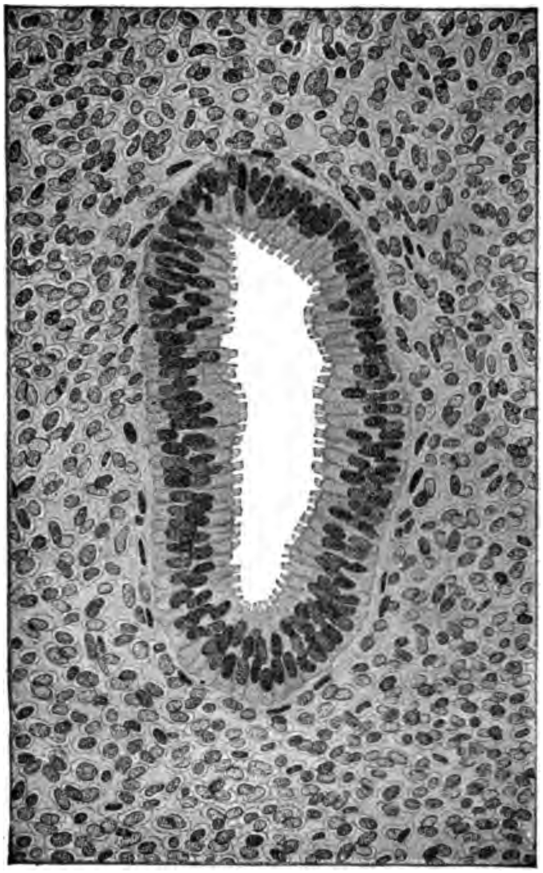

Fig. 543. A Microscopic Section of the Endometrium, showing the Stroma Cells and also a cross-section of a Gland. The structures are magnified 420 times. (Williams—*Obstetrics.*)

but any general change to a marked degree in size or shape, means some disease. There are normally no connective tissue fibers or muscle fibers or vessels with well-marked walls, in the cytogenic tissue near the free surface of the mucosa, though all these may appear in certain abnormal conditions.

The free surface of the endometrium is covered with a layer of **ciliated columnar epithelial cells** (Fig. 540). These have a large reticular nucleus, situated near the center of the cell but a little closer to the attached end than to the free end The cilia are not seen in the ordinary preparation but come out well in Fig. 543.

The endometrium contains many **glands.** These are simply tubular depressions of the lining epithelial layer (Fig. 541). The epithelial cells lining the glands present the same general characteristics as the cells on the surface of the endometrium (Fig. 543). The glands are formed by infolding of the epithelial lining of the endometrium. At puberty they increase in number and at each menstrual period they increase slightly in length.

Normal Changes in the Endometrium.

The structure of the endometrium undergoes normal changes due to menstruation, to pregnancy and to the menopause.

Menstruation. During menstruation the endometrium becomes engorged with blood, and this, with some slight hypertrophy, is essentially all the change there is. The marked growth of the endometrium followed by its wholesale disintegration, which was formerly supposed to take place, has been found not to occur normally. There is simply marked engorgement, which comes on rather slowly and disappears slowly. As a result of this engorgment the endometrium becomes much swollen and there is extravasation of blood into the stroma, among the stroma cells (Fig. 544). From there, part of it finds its way into the glands and then into the cavity of the uterus, while another part of it passes directly through the surface epithelial-layer into the cavity. This extravasation of blood interferes somewhat with the nutrition of the epithelium in small areas and the epithelium is thrown off over these areas and appears in the menstrual discharge as single cells or as groups of cells. There may occasionally be a small piece of stroma cast off, but there is no disintegration of any considerable portion of the endometrium, as formerly supposed. In many cases of ordinary dysmenorrhoea, small pieces of the endometrium are cast off, but these changes are abnormal, as are also the cases of marked "dysmenorrhoea membranacea." After menstruation the extravasated blood which has not passed into the cavity is absorbed from the stroma together with the remnants of those stroma cells that have been so damaged that they disintegrate. In a few days the endometrium has returned to its normal resting condition. Menstruation as a function, is considered in detail in chapter XIV.

Pregnancy. The changes in structure due to pregnancy are marked and exceedingly interesting, but a description of them would be out of place here.

Menopause. At the menopause the senile change begins to be manifest. This is essentially an atrophy of the cytogenic tissue and of the glands, with the development of fibrous tissue throughout the endometrium, hyaline changes in the vessels and finally loss of the surface epihtelium, so that the endometrium comes to resemble scar-tissue. This process extends over several years and may be encountered in any stage of development. Many senile uteri present conditions very different from the normal ones here mentioned, but those different conditions are due to pathological processes and not to senility.

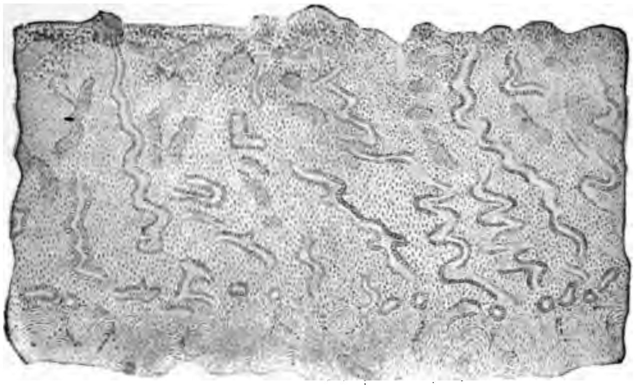

Fig. 544. The Menstruating Endometrium. The dark areas are formed by extravasated blood. The wavy canals are the gland-cavities. (A. Martin—*Atlas of Gynecology.*)

Peculiarities of the Cervix Uteri.

The structure of the cervix differs from that of the body of the uterus in several particulars, as follows:

a. The greater part of the cervix has no peritoneal covering (Fig. 539).

b. The muscular layer of the cervix has a much larger proportion of connective and hence is much firmer.

c. There are no large venous sinuses in the cervix and the blood-vessels have thicker walls and smaller lumina than those of the body of the uterus.

d. The mucous membrane lining the cervix (cervical mucosa) is disposed in prominent folds (Fig. 531). These folds extend more or less obliquely outward from two ridges, one situated near the center of the posterior lip and the other near the center of the anterior lip.

e. The glands of the cervix approach the racemose variety. They consist of branching ducts with dilated ends (Fig. 545). The glands are lined with columnar epithelial cells which are even taller than those on the surface. The nucleus of each cell lies at the base. These cells secrete mucus which does not stain appreciably in ordinary preparations (haematoxylin and eosin), consequently that portion of the cell lying next to the lumen, which part of the cell is usually filled with mucus, appears clear (Fig. 545).

The glands of the cervix secrete a clear viscid tenacious mucus that fills the cervical canal and serves to close it and prevent invasion of the uterine cavity. The ducts of these glands sometimes become obstructed causing retention cysts (Fig. 337). These are sometimes called "ovulae Nabothi." There may be many of them, in which case the cervix is said to be in a state of "cystic degeneration (Figs. 559, 560).

f. The layer of cytogenic tissue with characteristic stroma cells, is compar tively thin in the cervix.

g. The cervical mucosa does not take part in the changes of menstruation c

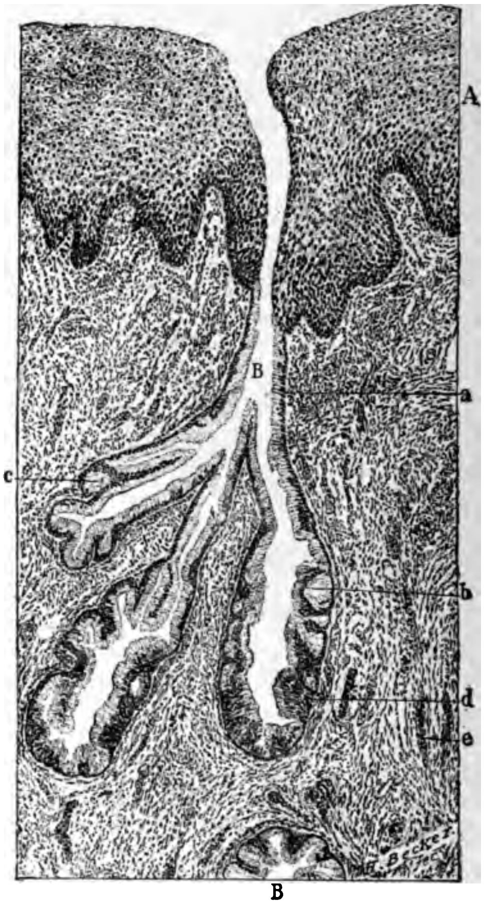

Fig. 545. Longitudinal section of a Gland of the Cervix. This is evidently taken from near the external os, as the squamous epithelium extends up to it. A cross-section of part of a gland is shown at the lower margin. (Cullen—*Cancer of the Uterus.*)

pregnancy, except in rare cases. It does, however, undergo the atrophy of senility, but here the change is not so marked as in the endometrium for the cytogenic tissue is not so abundant.

Vessels and Nerves of the Uterus.

The blood supply of the uterus comes from the uterine and ovarian arteries. The **uterine artery** of each side arises from the anterior trunk of the internal iliac

(**Fig. 546**) and passes inward and downward between the layers of the broad ligament to just above the lateral vaginal fornix. It then turns upward and runs in a very tortuous course along the side of the uterus. Near the top of the uterus it joins the descending branch of the ovarian artery (Fig. 547).

As it runs along the side of the uterus, the uterine artery gives off many branches which run horizontally about the organ and supply various segments. These anastamose with corresponding branches of the opposite artery. These branches are very tortuous, the tortuous and spiral arrangement being so marked that they have been called the "curling arteries" of the uterus. A horizontal branch of considerable size at the level of the internal os is known as the "circular

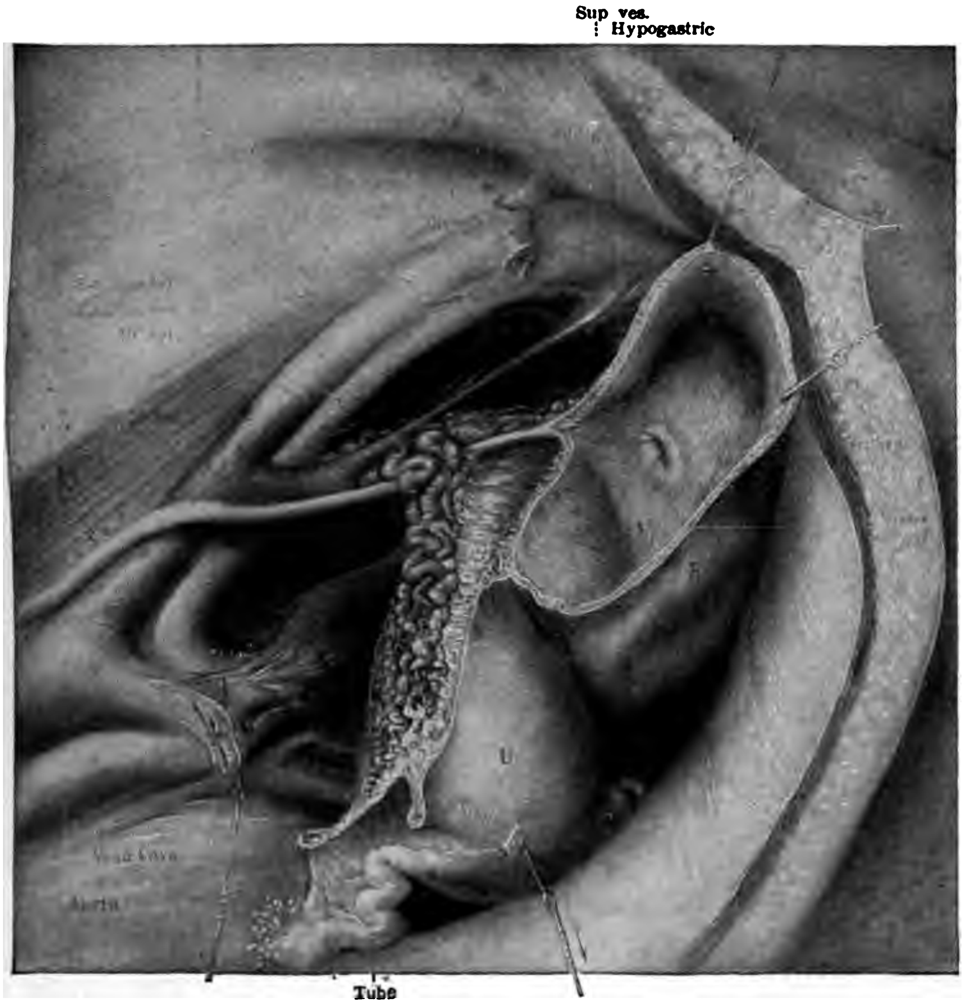

Fig. 546. The Blood Supply of the Uterus. Showing the Uterine Artery as it leaves the anterior trunk of the internal iliac. (Kelly—*Operative Gynecology*.)

The **ovarian artery** of each side supplies the tube, and ovary and upper part of the uterus. They correspond to the spermatic arteries in the male and arise directly from the aorta. The artery of each side passes downward and enters the broad ligament. After giving off the branches that supply the ovary, the artery passes on to the upper part of the uterus where it divides into two branches. The upper branch supplies the fundus uteri and anastamoses with the corresponding branch of the opposite artery. The lower and larger branch descends along the side of the uterus and anastamoses with the uterine artery. Some authorities describe the uterine artery as supplying all of the side of the uterus and a part of the tube, and anastamosing with the ovarian artery some distance out along the tube. Possibly the distribution differs considerably in different individuals.

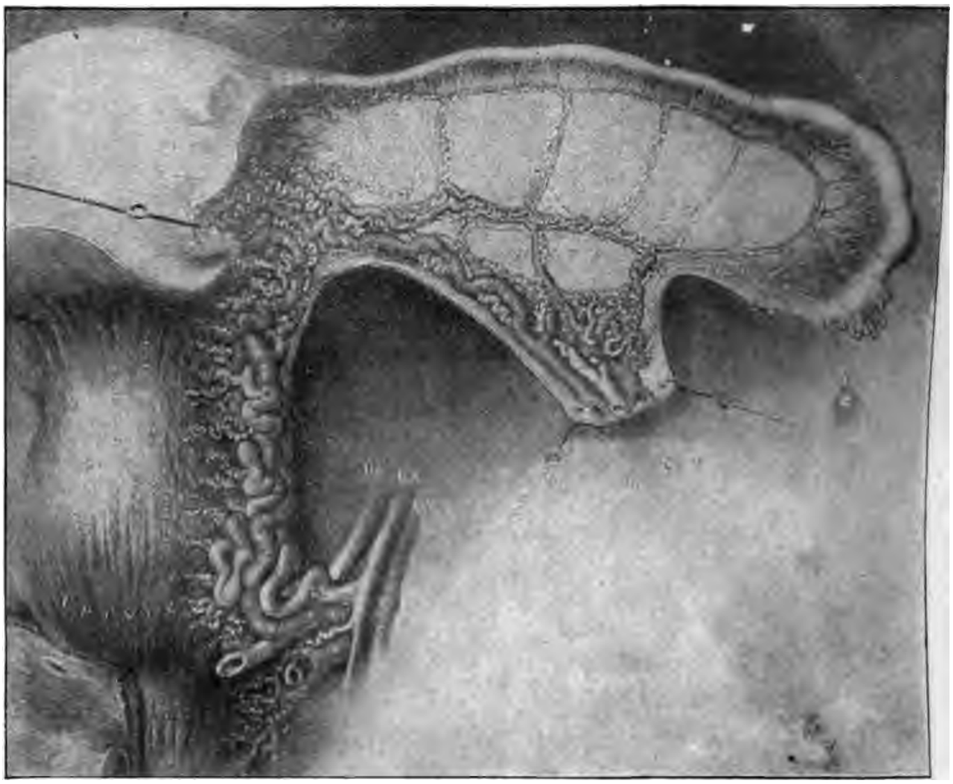

Fig. 547. The Blood Supply of the Uterus. Showing the course of the uterine artery along the side of the uterus. The ovarian vessels also are shown. (Kelly—*Operative Gynecology*.)

The **veins** of the uterus are exceedingly numerous. The organ is surrounded by a vast network of these vessels, which receive the blood from the veins and sinuses within its walls. There is free communication of these plexuses with the vaginal and vesical plexuses below and with the ovarian (pampiniform) plexus above, the blood ultimately emptying into the internal iliac vein.

An important fact, from a surgical standpoint, is that in the median line the **uterus** is almost free of blood-vessels—so much so that it may be bisected (as is **frequently** done in vaginal hysterectomy) with but little hemorrhage.

The lymphatics of the uterus may be divided into two groups, the lymphatics of the cervix and the lymphatics of the body of the uterus, as shown in Fig. 548. The lymphatics of the cervix uteri join with those of the upper part of the vagina and empty into the sacral and hypogastric and superior iliac glands. The lymphatics from the corpus uteri join with those of the tube and ovary and empty into the lumbar glands. A few lymphatics from the uterine cornua pass along the round ligaments and empty into the inguinal glands. The distribution the of uterine lymphatics to the various glands is shown in Fig. 549.

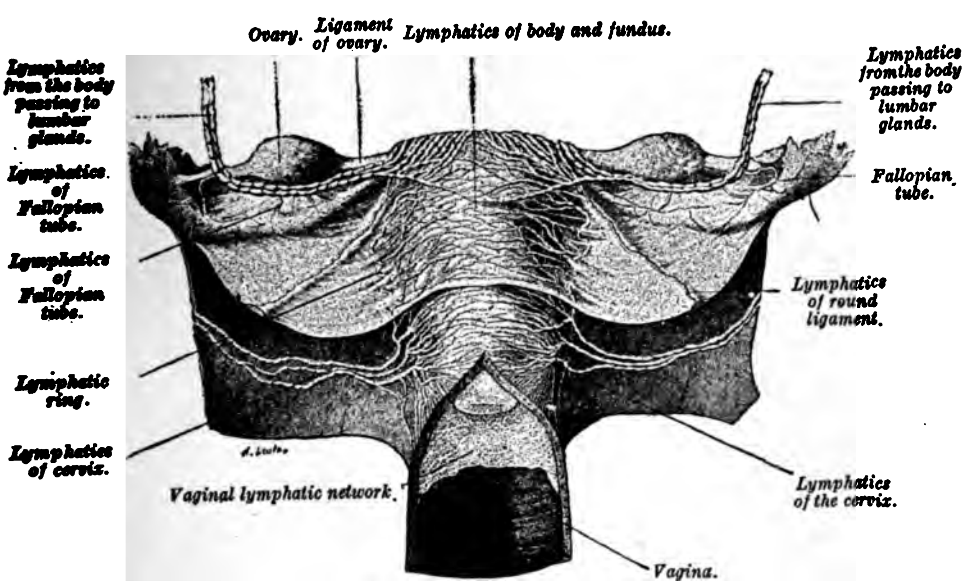
Ovary.
Ligament of ovary.
Lymphatics of body and fundus.
Lymphatics from the body passing to lumbar glands.
Lymphatics. of Fallopian tube.
Lymphatics of Fallopian tube.
Lymphatic ring.
Lymphatics of cervix.
Vaginal lymphatic network.
Lymphatics from the body passing to lumbar glands.
Fallopian tube.
Lymphatics of round ligament.
Lymphatics of the cervix.
Vagina.

Fig. 548. The Lymphatics of the Uterus. The collection of the lymphatic vessels of each side into two groups one from the cervix uteri and the other from the corpus uteri, is well shown. (Poirier—*The Lymphatics*.)

The nerves of the uterus are derived from the hypogastric plexus of the sympathetic and from the third and fourth sacral nerves of the central nervous system.

Ligaments of the Uterus.

The uterus is held in its position by the pelvic floor and by certain ligaments (Fig. 550). The ligaments are eight in all, four on each side. They are the broad ligaments, the round ligaments, the sacro-uterine ligaments and the vesico-uterine ligaments.

The **vesico-uterine ligaments** are simply folds of peritoneum extending from the uterus to the bladder, as shown in Fig. 550.

The **sacro-uterine ligaments** are similar folds of peritoneum extending from the

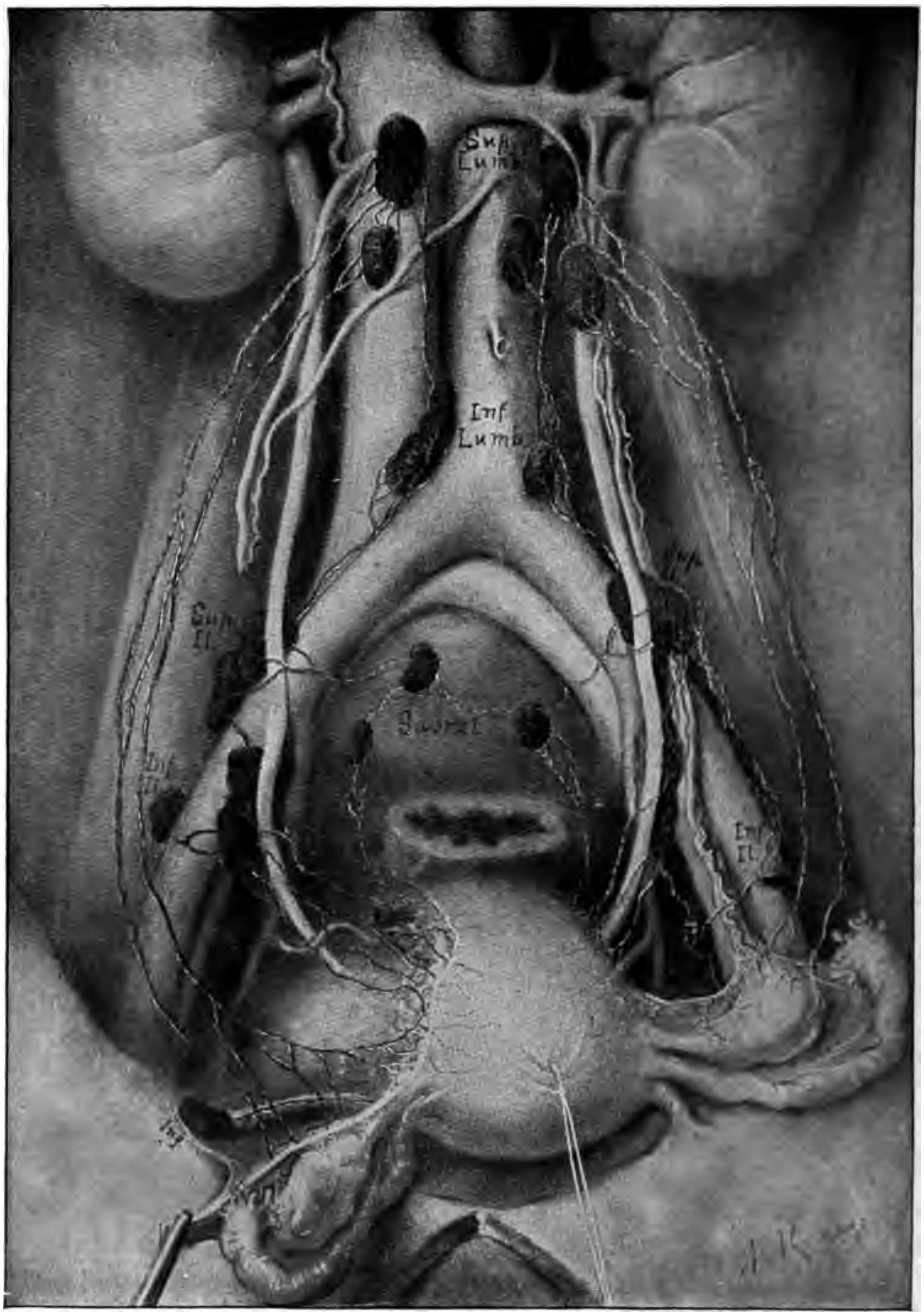

Fig. 549. The Distribution of the Lymphatics of the Uterus to the various Groups of Glands. (Döderlein and Krönig—*Operative Gynakologie.*)

uterus around the rectum to the sacrum (Figs. 4 and 550). They contain also some fibrous tissue and a few muscular fibers, hence they are stronger.

The round ligament of each side is a fibro-muscular cord which arises from the top of the uterus just in front of the Fallopian tube and extends outward and forward in the upper part of the broad ligament to the internal inguinal ring (Figs. 5 and 550). It then passes through the inguinal canal and at the external ring divides into fibrous filaments which are lost in the tissues covering the pubic joint (Fig. 5). The round ligaments are four or five inches in length and tend to prevent marked backward displacement of the uterus. Ordinarily they are lax but when the uterus is displaced backwards by a full bladder or other condition, they are made tense and help to bring the uterus back to its accustomed position. It is the round ligaments that are shortened in certain operations for the cure of backward displacement of the uterus.

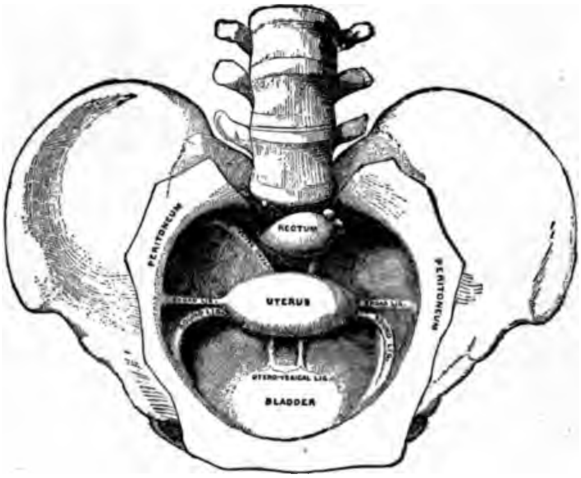

Fig. 550. The Ligaments of the Uterus. (Hodge—*Diseases Peculiar to Women.*)

The broad ligament of each side extends from the lateral portion of the uterus to the pelvic wall (Fig. 550). The attachment to the uterus extends all along the side of the organ from the cervix to the fundus, and there is a correspondingly wide attachment to the pelvic wall. This gives a broad band of tissue (hence the name "broad" ligament) extending from the lateral margins of the uterus to the pelvic wall and holding the uterus in its appointed position in the center of the pelvic cavity (Figs. 4, 550). Each broad ligament is composed of two layers of peritoneum (Fig. 539), and between them are a number of important structures. This disposition of the peritoneum and consequent formation of the broad ligaments, is represented very well by a thin cloth laid over the pelvis and then tucked down snugly around the pelvic organs. The peritoneum covering the anterior surface of the uterus, when continued laterally forms the anterior layer of the broad ligament, and that covering the posterior surface of the uterus, continued laterally, forms the posterior layer of the broad ligament. Between these two layers of peritoneum is a considerable amount of connective tissue and also the following important structures:

a. Fallopian tube (Figs. 3, 4, 5).

b. Ovary (Fig. 4). This is not really situated in the broad ligament but rather *on* the posterior surface of the ligament. There is, however, a break in the peritoneum at this point through which the hilum of the ovary is in direct continuation with the connective tissue and vessels of the broad ligament (Fig. 672).

c. Parovarium (Figs. 531, 681, 682).
d. Ovarian vessels (Fig. 547).
e. Round ligament (Figs. 5, 550).
f. Uterine vessels (Figs. 546, 547).
g. Ureter. The ureter, in its course to the bladder, lies in the lower part of the broad ligament, near the cervix and just under the uterine artery (Figs. 546, 547, 549).

PATHOLOGICAL CHANGES.

By the term "pathological changes" as here used, I do not refer to diseases, but only to indiviudal structural changes, as encountered in various combinations in the inflammatory and nutritive diseases of the uterus.

An entirely satisfactory classification of the inflammatory and nutritive diseases of the uterus is not possible along the simple lines which suffice in some other localities.

A SYMPTOMATIC classification is found wanting because cases giving the same symptoms may present very different etiological factors and pathological conditions—in fact, the same case may show several distinct pathological changes in combination. On the other hand, a classification strictly according to ETIOLOGY or PATHOLOGY alone, is not satisfactory, for the same etiological factors may give rise to various pathological changes, and, again, pathological changes essentially the same, may give rise to various clinical pictures. So true is this, that in many cases it is impossible, from the symptoms and usual examination-signs, to determine certainly the etiology of the trouble or the exact pathological changes present.

I think the best way to present this subject is to give first the essential pathological changes that take place in the uterus as the result of inflammatory and nutritive disturbances, and then to take up the separate diseases, classified largely according to symptoms but bearing in their titles such etiologic and pathologic distinctions as are usually easily determined.

The **nutritive changes** found in the uterus are due largely to modifications in the quantity or quality of the blood supplied to the tissues, through the innervation and the lymph flow, probably exercises some influence. The quantity and quality of blood supplied to the uterus may be modified by many conditions, for example, general diseases causing pronounced anemia, acute diseases causing toxins and other abnormalities in the blood, heart disease causing venous congestion of the uterus, acute pelvic inflammation causing arterial congestion of the uterus, tumors and malposition causing venous congestion, etc.

Under nutritive changes may be classed the following:

Hyperemia (arterial and venous).
Serous infiltration.
Hemorrhagic infiltration.
Disintegration and liquefaction.
Hyperplasia.
Hypertrophy.
Atrophy.
Obstruction of glands, with cystic dilatation.
Hyaline degeneration.

The inflammatory changes are due to severe local irritation. The local irritation may be due to chemical substances (as in cauterization of the endometrium with penetrating chemicals) or to heat (as in cauterization by steam) or to invading cells (as in cancer) or to bacteria and their products (as in the various infections). Bacteria and their products constitute by far the most frequent cause. In inflammation, the nutrition of the tissues is more or less disturbed and consequently there may occur any of the various nutritive changes already mentioned, in addition to the changes distinctive of inflammation.

The inflammatory changes are as follows:

Round-cell infiltration (leucocyte infiltration and lymphocyte infiltration.)
Connective-tissue formation.
Thrombosis.
Necrosis.
Abscess formation.
Sloughing.

My space is too limited to accommodate the details of these various pathological changes. Each change mentioned, however, has definite characteristics and significance, which will be found elucidated in works on Pathology.

CLASSIFICATION OF DISEASES.

In the inflammatory and nutritive diseases of the uterus, there are all gradations in pathological conditions, from a slight nutritive disturbance in a uterus otherwise normal, to the terminal stage—cirrhosis—which represents complete destruction of the uterus as a functionating organ. The process is progressive and depends on two factors—irritation and poor nutrition, usually represented respectively by bacteria and inadequate blood supply. One or the other of these factors is always present, and in many cases both are present, the character of the disease depending on the predominating factor.

Though no entirely satisfactory classification of the inflammatory and nutritive diseases of the uterus has yet been devised, still there are classifications that do very well for practical purposes. The following classification is the one I have found most convenient. It is practical, in that the various named conditions are as a rule distinguishable at the bedside, and the names are sufficiently distinct and accurate to indicate in a general way the pathology of the conditions named.

In the **cervix uteri** there occur the following inflammatory and nutritive diseases:

Erosion of cervix.
Ulcer of cervix.
Acute Endocervicitis.
Chronic Endocervicitis.
Laceration of cervix.
Idiopathic Hypertrophy of cervix.
Polypi of cervix.

In the **corpus uteri** there occur the following inflammatory and nutritive diseases:

Acute infected Endometritis and Metritis.
Acute simple Endometritis.
Chronic infected Endometritis.
Chronic Simple Endometritis.
Subinvolution of uterus.
Hyperinvolution of uterus.
Sclerosis of uterus.
Tuberculosis of uterus.
Syphilis of uterus.
Echinococcus disease of uterus.

LOCALIZATION OF DISEASES.

The diseases under consideration are situated in various parts of the uterus. Some of them, particularly gonorrhoeal and septic infection, show a marked tendency to affect all portions of the genital tract—spreading from the cervix to the endometrium and from there to the Fallopian tubes and to the peritoneal cavity, and also through the wall of the uterus to the periuterine connective tissue and to the peritoneum. In tubercular infection the progress is generally downward, the infection spreading from the Fallopian tubes to the endometrium. Other processes affect the whole uterus simultaneously, though in varying degree, for example, subinvolution following labor or abortion. Still other inflammatory or nutritive processes are localized to one part of the organ, for example, erosion (cervix), simple endometritis (endometrium).

The inflammatory and nutritive diseases are localized principally as follows:

a. Vaginal surface of cervix. This is the seat of erosions and of ulcers of various kinds.

b. Cervical mucosa and adjacent tissues. Here are found acute endocervicitis (septic and gonorrhoeal), chronic endocervicitis (septic, gonorrhoeal and glandular) and cervical polypi. In endocervicitis the process is not confined to the cervical mucosa but invades the adjacent tissues to a greater or less extent, hence it is sometimse called cervical metritis, signifying that the cervix as a whole is involved. But the process starts in the mucosa and the principal changes are found there, consequently I think the term "endocervicitis" preferable.

c. Muscular and connective tissue of the cervical wall. Occasionally an acute inflammatory process is principally localized here and may result in an abscess. Usually, however, the changes in these tissues are either secondary to endocervicitis, resultingin cellular infiltration and connective tissue formation with subsequent sclerosis, or the changes are primarily nutritive in character, partaking of the nature of hyperplasia. The first condition (secondary cellular infiltration) is found accompanying cystic disease and all inflammations of the cervix, particularly chronic infected endocervicitis. The second condition (hyperplasia) is found in the so-called "idiopathic hypertrophy" of the cervix.

d. Endometrium and adjacent tissues. Most of the inflammatory and nutritive diseases of the body of the uterus start in the endometrium. On account of the absence of a submucous connective-tissue layer in the uterus (the mucosa being placed directly of the muscular wall), inflammatory processes starting in the endometrium soon affect the underlying muscular tissue, the depth to which the serous and cellular infiltration extends depending on the severity and duration of the disturbance.

The endometrium is the seat of acute endometritis (septic or gonorrhoeal), of chronic infected endometritis (septic or gonorrhoeal), of chronic simple endometritis (hypertrophic or atrophic), and of tuberculosis.

e. **Muscular and connective tissue of the corpus uteri.** These tissues, as previously explained, are affected in practically all cases of endometritis, but only secondarily and in a minor way. The inflammatory and nutritive affections situated principally in these tissues are acute diffuse metritis (with or without abscess formation), cirrhosis of uterus and subinvolution.

f. **Peritoneal coat of uterus.** Those diseases affecting principally the peritoneal layer of the uterine wall are considered under affections of the pelvic peritoneum, in chapter x. They are peritonitis and tuberculosis of the peritoneum.

EROSION OF CERVIX.

An erosion of the cervix is an area on the vaginal surface of the cervix which is covered with columnar epithelium, and consequently presents a reddened inflamed appearance. Some confusion has resulted from the application of the term "ulceration of cervix" to this condition. There is no ulcer and no granulating surface, for the whole area is still covered with epithelium.

Etiology and Pathology.

The erosion is caused by an irritating vaginal or uterine discharge. The discharge may originate in the vagina (e. g., gonorrhoeal vaginitis) or in the cervix (endocervicitis) or in the body of the uterus (endometritis). Any condition that gives rise to an irritating discharge may cause an erosion of the cervix.

The reddened appearance seen in erosion is due to the development outside of the external os of a surface-covering that resembles the cervical mucosa, i. e., there is but one layer of cells and they are columnar. This thin epithelial layer permits the underlying vascular tissue to show through, and thus gives the area its red appearance.

On microscopic examination the red patch is found to be covered with a single layer of columnar epithelial cells (Fig. 551). As this epithelial layer proliferates, however, it shows a marked tendency to become much folded, forming deep depressions and tall papillae, a condition known as a **papillary erosion.** Not infrequently the tips of the papillae or folds become adherent, formingc losed cavities or follicles between them, which become filled with secretion or exudate. This is called **a follicular erosion.**

Just why this columnar epithelium should develop on a surface previously covered with squamous epithelium, is not positively known. It is generally supposed to be due principally to the proliferation or outgrowth of the mucosa of the cervical canal beyond the external os, the proliferation being caused by one of the various forms of irritation previously mentioned.

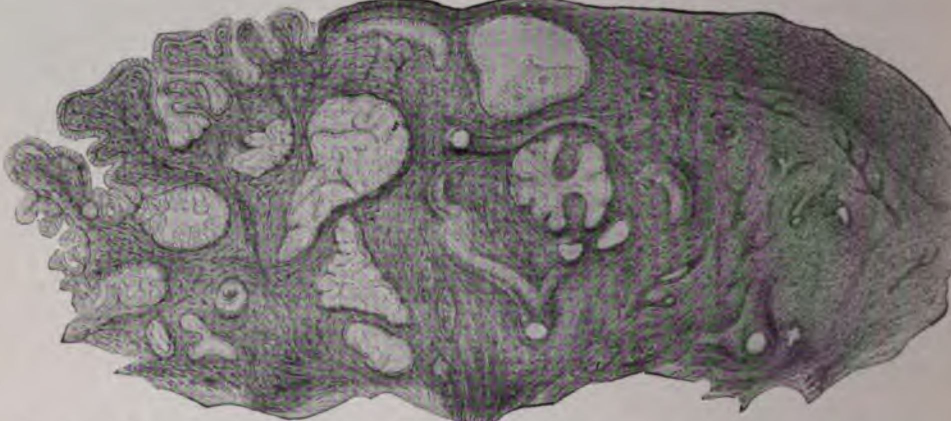

Fig. 551. Section through an Erosion of the Cervix. At the right is the normal squamous epithelium covering the vaginal portion of the cervix. At the left is the Area of Erosion, showing the papillary projections covered with a single layer columnar epithelium. The cavities below the surface are gland cavities somewhat dilated, showing a tendency to cyst formation. (A. Martin—*Atlas of Gynecology*.)

Symptoms and Diagnosis.

The symptoms due to the erosion are usually obscured by the symptoms of the causative lesion. The erosion causes some increase in the discharge. The cervix is so insensitive that but little if any pain results. On examination, a mucopurulent discharge is found. When the cervix is exposed, a reddened angry-looking area is seen about the external os, extending outward irregularly and gradually shading into the normal covering (Figs. 438, 439). Though the lesion is superficial it may bleed when touched.

The lesions which may be confused with erosion of the cervix are superficial abrasion, ulcer of cervix, and eversion of mucous membrane.

Superficial ABRASION of the vaginal portion of cervix is a rather rare condition presenting an appearance somewhat like an erosion, but the microscopic appearance is entirely different. Several layers of the epithelium have been rubbed off but the surface is still covered with squamous epithelium. An abrasion is usually due to mechanical effect (pressure of pessary or other foreign body) and does not present the complicated etiology or pathology of erosion. It usually occurs at the point where the pressure comes on the cervix (from pessary or other body) and not especially about the external os, as does the erosion. Its outline is not so well marked and it usually disappears rapidly after the cause is removed.

An ULCER of the cervix presents a clear-cut border, sometimes raised and indurated, and the base of the ulcer is formed by granulation issue. The different forms of ulcer (simple, chancroidal, syphilitic, tubercular, malignant) present also special characteristics, which will be given later.

In EVERSION OF MUCOUS MEMBRANE from laceration, the fact that the cervix has been lacerated is apparent, and close examination of the reddened surface will show that it is turned-out endocervical mucous membrane. An erosion of the cervix may coexist with eversion, in fact, the combination is very frequent, the erosion being due to the irritating discharge caused by the laceration and eversion.

Treatment.

1. Remove the cause. If due to the irritation of a pessary, the pessary must be removed for a time. If due to an irritating discharge from the vagina or uterus, the primary lesion (causing the discharge) must receive appropriate treatment.
2. Keep the vagina clean with antiseptic douches taken once or twice or three times daily, the frequency depending on the amount of discharge.
3. Every second or third day apply some antiseptic astringent, for example, a 10% solution of silver nitrate or protargol or copper sulphate, and then dust in an antiseptic astringent powder and introduce a dry tampoon against the cervix. The tampon is to be removed the next morning and the douches continued until the next office treatment.

ULCER OF CERVIX.

An ulcer of the cervix is an area on the cervix which has lost its epithelial covering down to connective tissue, the base being formed by granulation tissue or slough.

The causes of an ulcer of the cervix are simple irritation (as from a pessary or a very irritating discharge or from rubbing of the clothing when the uterus is prolapsed), chancroidal infection, syphilis, tuberculosis, and malignant disease.

The essential pathology is stated in the definition. It differs from an erosion in that there is a distinct break in the epithelial covering of the cervix.

Symptoms and Diagnosis.

The most prominent symptom of ulcer of the cervix is vaginal discharge, which is sometimes streaked with blood. When the cervix is exposed with the speculum the ulcer on its surface comes into view. It may be large or small, superficial or deep. It often bleeds when touched.

The conditions that may be confounded with ulcer of the cervix are erosion of cervix and laceration of cervix with eversion of mucosa. In **erosion** the lesion is very superficial and usually surrounds the external os and the whole surface is still covered with epithelium. The cause is usually apparent and there is no raised clear-cut border nor sunken base. In **laceration** of cervix with eversion of mucosa, the laceration is apparent, and by clearing all secretion from the reddened surface and examining it closely, it can be seen that it is mucous membrane and not granulation tissue.

After the diagnosis of ulcer is established, the next step is to determine **what kind** of an ulcer it is. A rapidly spreading ulcer with undermined or punched-out edges, following suspicious intercourse, is probably chancroidal. A chronic ulcer resisting treatment is either syphilitic, tubercular or malignant. If syphilitic, there will be other evidences of syphilis. If tubercular, scrapings from the surface or sections of tissue will show tubercle bacilli. A malignant ulcer, that is, an ulcer due to the breaking down of malignant infiltration, usually presents a wide area of infiltration about the ulcerated portion. It shows also a decided tendency to bleed and the bleeding is not stopped by the repeated application of 10% copper sulphate solution. If the patient is aged, that increases the probabbility of the trouble being malignant. Any chronic ulcer resisting treatment without apparent cause (persistent irritation, syphilis or tuberculosis) is probably malignant, and should have a piece excised for microscopic examination, that malignant disease may be excluded or proven.

Treatment.

The treatment depends of course on the character of the ulcer?

In **simple ulcer.** If due to a pessary, remove the pessary and give a hot antiseptic douche two or three times daily, depending on the amount of discharge. Also every other day or every third day, introduce the speculum, expose the ulcer, make an application of copper sulphate (10%) or some other astringent, and then dust on an antiseptic astringent powder and introduce a tampon to hold the powder in place against the cervix. The tampon is to be removed the next morning and the douches continued until the next office treatment.

A **chancroidal ulcer** which spreads in spite of the measures mentioned under simple ulcer, should be cauterized deeply with carbolic acid and then treated the same as a simple ulcer.

In **syphilitic ulcer** the patient should receive constitutional treatment. The local treatment is about the same as for simple ulcer.

A **tubercular ulcer** without decided tuberculosis elsewhere, should be excised if its situation will admit. If it cannot be excised it should be thoroughly curetted and cauterized deeply with carbolic acid or nitric acid or lactic acid or the thermocautery. After cauterization, the treatment is the same as for simple ulcer, except that the use of iodoform is especially indicated. If the ulcer extends some distance up the cervical canal or is associated with tuberculosis of the endometrium or Fallopian tubes, hysterectomy, vaginal or abdominal, is indicated, provided of course that there is no other lesion contra-indicating such a course. At the same time, internal antitubercular remedies are indicated.

If the ulcer is **malignant** (carcinoma or sarcoma) the uterus should be removed at once.

If the character of the ulcer is **doubtful,** and remains so after a short course of treatment, excise a piece of tissue from the margin of the ulcer and submit it to a pathologist for microscopic examination.

ACUTE ENDOCERVITIS.

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Etiology and Pathology.

Acute endocervicitis is due to infection with the gonococcus or with ordinary pus germs. In gonorrhoeal vaginitis, the inflammation frequently extends into the cervix and may remain in check there for sometime. If in a case of gonorrhœal vaginitis applications are made within a healthy cervix, gonorrhœal endocervicitis is likely to result. Some authorities hold that gonorrhœal endocervicitis is usually the primary lesion and that the vagina is infected from these. This probably takes place in some cases but it is hardly to be considered the rule.

Ordinary septic endocervicitis may follow labor or abortion, but then it is usually overshadowed by the more serious inflammation in the body of the uterus, i. e., the septic endometritis.

The pathological changes are practically the same whether the inflammation be ordinary septic or gonorrhœal, except that the former is usually accompanied by mechanical injuries (cervical lacerations). The changes are hyperemia and swelling of the mucosa, serous infiltration and round-cell infiltration (leucocyte and lymphocyte), with increased secretion.

Symptoms and Diagnosis.

The principal symptom of acute endocervicitis is **increased discharge** from the cervix with irritation resulting therefrom (Figs. 436, 437). The cervical secretion is tenacious and stringy and resembles the white of an egg except that it is less fluid and more jelly-like. The normal cervical secretion is alkaline. There is usually considerable **erosion** about the external os, from the irritating discharge. There is also **hyperemia** of the cervix and **bleeding** on slight manipulation. The patient has an uneasy sensation of weight and discomfort in the pelvis, though acute endocervicitis alone rarely causes pain. If there is much pain it is probably due to some other trouble, for which search should be made.

Acute endocervivitis causes but little trouble in diagnosis. The irritating discharge from the external os shows that there is inflammation above that point. The short duration excludes chronic endocervicitis and malignant trouble. The absence of pain and of tenderness of the body of the uterus on bimanual examination, and the absence of other symptoms of endometritis, shows that the inflammation is not in the body of the uterus, consequently it must be in the cervix. When the cervical mucosa is touched with the sound or applicator it may bleed, showing that there is hyperemia and inflammation, and confirming the diagnosis perviously reached by exclusion. The bleeding, however, is not a prominent feature, not nearly as prominent as in cancer and other forms of ulcer. In endocervicitis, the character of the discharge, which is markedly tenacious, indicates that most of it comes from the cervical glands. Whether or not it is gonorrheal may be determined by looking for evidences of gonorrhœa elsewhere (vagina, urethra, vulvo-vaginal glands) and by examining the discharge for gonococci.

Treatment.

The objects of treatment in a case of acute endocervicitis are three—(1) to prevent the inflammation from spreading to the mucous membrane of the body of the uterus, (2) to prevent the inflammation from extending deeply into the glandular structure of the cervix where it will become chronic and (3) to stop the irritating discharge and the consequent discomfort. In all applications and other manipulations in acute endocervicitis, if the body of the uterus is free from inflammation, it is very important not to disturb the internal os. The plan of treatment is as follows:

1. Apply protargol or silver nitrate (4% to 10%) to the interior of the cervix every second or third day. If the patient has gonorrhœal vaginitis, the endocervical application is of course made at the same time that the vagnia is treated. A thin strip of gauze saturated with the desired liquid is placed in the cervix and held in place for twenty-four hours by a glycerine tampon. The tenacious cervical mucus, which prevents the medicine from coming in direct contact with the mucosa, should first be removed with the forceps or cotton-wrapped applicator or small curet. A weak solution of liquor potassae helps in clearing out this mucus. After the endocervical application, a tampon soaked in boro-glyceride or in ichthyol-glycerine (10%) should be placed against the cervix. If a strong astringent application is desired, tannic-acid-glycerine (10%) may be used on the tampon.

2. If the external os is not open sufficiently to give good drainage, it should be opened by dilatation or incision. If the whole cervix is congested and swollen, multiple punctures with the point of a bistory, deep enough to give free bleeding, is beneficial.

3. Give a hot antiseptic vaginal douche (e. g. bichloride douche) every six to twelve hours. If there is no coincident inflammation of the vagina an astringent douche solution may be used, such as the alum and zinc sulphate douche.

4. The patient should do but little walking and should keep rather quiet, though it is not necessary to go to bed.

Other applications which have been found beneficial are formol, 25%, tincture of iodine, iodo-phenol, carbolic acid, bichloride solution (1–500), ichthyol (pure), ichthyol (25%) in glycerine or lanolin, iodoform in ether (saturated solution), iodoform and tannic acid half and half. Some cases yield better to one application and some to another. Skene usually used a mixture of tincture of iodine two parts and carbolic acid one part. These strong applications should not be made oftener than every five to seven days. The application may be made with a cotton-wrapped applicator dipped into the solution or with the pipette, by which a small amount of the desired solution is placed within the cervical canal.

Acute endocervicitis occurring in conjunction with acute endometritis is overshadowed by the latter and requires little or no separate treatment.

CHRONIC ENDOCERVITIS.

Chronic endocervicitis is chronic inflammation of the cervical mucosa and of the tissues adjacent thereto. It is known also as "cervical catarrh," "glandular endocervicitis," "cystic disease," "cystic degeneration," "glandular degeneration," and "inflammatory hypertrophy."

Etiology and Pathology.

Chronic gonorrhoeal endocervicitis and chronic septic endocervicitis usually follow acute inflammation of like character, though in some cases the acute symptoms are so slight as to escape notice.

Laceration of the cervix is a fruitful source of chronic endocervicitis, often without the intervention of acute inflammation in any form. The cervical glands and lymph-spaces are torn open and the resulting scar-tissue obstructs the gland-ducts, thus leading to cystic degeneration. Laceration also causes eversion of the mucosa so that it is exposed to friction against the vaginal wall, with consequent chronic inflammation. Anything that causes uterine congestion tends to keep up the endocervicitis.

The infecting germs penetrate into the mucosa of the cervix, affecting the glands and the interglandular tissue and causing round-cell infiltration. There is increased secretion from the cervix and the discharge is irritating, causing erosion of the cervix and also causing vaginal and urethral irritation. The cervix is enlarged and chronically congested, and eversion of the mucosa takes place. If there has been laceration with eversion of mucosa, the chronic inflammation still further everts it. When there has been no cervical laceration, the mucosa may still become everted, thus enlarging the external os and giving the appearance of laceration. This swelling and eversion from chronic inflammation without laceration, may take place in the virgin, and in some cases has given rise to an erroneous diagnosis of previous pregnancy.

In chronic endocervicitis the mucous membrane may become thickened irregularly, from the hyperplasia and round-cell infiltration, and thus form papillary growths. If this process goes on, it may form polypi ("mucous polypi," "cervical popypi"). If the external os is so small that there is not good drainage, the secretion will accumulate in the cervical canal and cause dilatation above the external os. This retention of irritating material may cause ulceration within the cervix. The gland-ducts become obstructed, causing the glands to be distended into small retention cysts. These distended glands are felt as hard nodules in the cervix and may give rise to an erroneous diagnosis of cancer, especially when associated with severe laceration. The cervix may be honey-combed with these small cysts (Fig. 559), producing a condition designated as "cystic degeneration" of the cervix. Sometimes one or more of the cysts will contain pus and will then appear as a yellow spot on the cervix. Occasionally one of the cysts or a group of them project into the canal and finally become pediculated, forming cervical polypi. Owing to the chronic inflammation, there is lymphocyte-infiltration and connective-tissue proliferation, producing enlargement of the cervix—called by Emmet "areolar hyperplasia." Later the contraction of this inflammatory tissue causes more or less disintegration of the other tissue elements and finally the cervix passes into a condition of cirrhosis or sclerosis, corresponding to the same process in the body of the uterus, which is known as sclerosis or interstitial metritis.

The long-continued irritation of chronic endocervicitis and cystic disease is probably an important factor in the causation of cancer of the cervix.

Symptoms and Diagnosis.

The symptoms of chronic endocervicitis are chronic **vaginal discharge and erosion** of cervix. Associated with these, but due principally to accompanying lesions (chronic endometritis, laceration of pelvic floor, pelvic inflammation), are a sense of weight and dragging in the pelvis, backache, and pain over the sacrum (supposed to be the seat of reflex pain from the cervix.)

Chronic endocervicitis must be distinguished from chronic endometritis, laceration of cervix and cancer of cervix.

In chronic ENDOMETRITIS there is usually a history of pain in the lower abdomen and some menstrual disturbance, and often a history of salpingitis. Examination shows the uterus somewhat enlarged and tender. A complicating salpingitis is evidence that the inflammation has involved the body of the uterus as well as the cervix.

In CERVICAL LACERATION, the cervix loses its pyramidal shape and the edges are turned outward and the mucous membrane is everted or replaced by scar-tissue. The cervix is broader and larger than normal and may show two distinct lips. The extent of the tear can usually be better determined by the sense of touch than by sight, but the extent of the eversion of the mucosa is better seen than felt. The two conditions, chronic endocervicitis and cervical laceration, are often associated.

In BEGINNING CANCER of the cervix, there is usually an areaof in duration. Also, there is a marked tendency to bleed on manipulation and this tendency to bleed is not removed by 10% copper sulphate applications. Later, the discharge becomes offensive and sanguino-purulent and contains small particles (crumbly discharge), but the diagnosis should be made before these marked evidences develop, as it may be too late then to effect a cure. In any case in which there is a suspicion of cancer, a small piece of the tissue should be excised for microscopic examination (see page 86).

Treatment.

In chronic inflammation of the cervix, attention to the patient's general health is important. Marked anemia and lowered vitality from any cause, may predispose to chronic endocervicitis or cause it to persist. Consequently, if such conditions are present, appropriate treatment for the same should be given. Iron, quinine and arsenic are often indicated. The uric acid diathesis, or lithemia, is prone to cause persistence of chronic cervical inflammation. Diseases causing chronic pelvic congestion are especially effective in the same direction, hence measures directed toward the relief of pelvic congestion must be employed. In all cases of endocervicitis the most important step in treatment is to remove the cause of the disease when that is possible. Endometritis or malposition of the uterus should be corrected if present and the patient should be put on a regular tonic regime.

Locally the steps in treatment recommended for acute endocervicitis are indicated, and also the following additional measures:

1. If there are cysts, puncture and evacuate them and touch the cavities with

some antiseptic astringent. Cysts projecting into the canal may sometimes be located with a probe or tenaculum. They should be treated the same as those on the external surface. If necessary for the proper treatment the canal may be dilated. If the external os is too small to permit of good drainage or satisfactory local treatment, it should be opened by dilatation or incision. The contracted cervical outlet, or "pinhole os," is rather frequent in nullipara and causes retention of the secretion and increased irritation. In such a case if the os does not yield readily to dilatation it may be incised.

It is sometimes a good plan to curet the entire cervical canal lightly and then apply the desired medicine. Strong curettage, however, or the application of a strong cauterant, such as nitric acid, is liable to cause cicatricial stenosis, which later requires treatment by dilatation or incision.

2. If there is considerable laceration of the cervix, repair it as previously described. This is particularly important if there is hypertrophy or cystic disease. In the denudation for repair, a large part of the cystic portion may be excised.

3. If the cystic disease is still more marked, the cervix may be partially amputated by Schroeder's method (Fig. 561). This operation removes the cystic and infiltrated tissue on the inner side of the cervical lips and at the same time preserves the outer part of the cervix, which is comparatively normal.

LACERATION OF CERVIX UTERI.

Etiology.

The usual cause of laceration of the cervix is the passage of the head and shoulders of the child in **labor.** The cervix will stretch wonderfully when softened by pregnancy and slowly dilated by the bag of waters, but still there is nearly always some laceration.

In **operations** on the non-pregnant uterus, such as curetment, the cervix is occasionally torn in the preliminary dilatation.

A **congenital split** resembling a lateral laceration of the cervix has, in a few instances, been observed in the new born infant. This congenital notch is of little importance except that when seen in the adult it may lead to an erroneous diagnosis of previous pregnancy. A distinct laceration of the cervix is one of the strongest proofs of previous pregnancy and the fact that a congenital notch somewhat resembling a laceration may occur, is of medico-legal importance.

Pathology.

The tear of the cervix in labor usually affects both sides causing a **bilateral laceration,** with one side torn deeper than the other (Figs. 336, 440). Occasionally only one side is torn giving a **unilateral ulceration** (Fig. 334, 440). Sometimes the cervix is torn in several directions giving a **stellate laceration** (Fig. 439). Still another variety is the **internal laceration,** a tear not extending entirely through the wall.

Tears of the cervix are of all grades of severity. The tear may be very slight, leaving, after some weeks, only a small notch or depression (Fig. 332), or it may be very deep, even extending into the vaginal and pericervical connective tissue or into the bladder. In the deep tears, the lips may fall together and heal fairly well so that only a small notch is left. On the other hand, the lips may fail to unite in which case a deep notch may be left (Figs. 336, 440). Occasionally the cervix heals in such a way as to leave a fistula from the cervical canal into the vagina (cervico-vaginal fistula). In the case of an "internal laceration" the cervix may appear to be simply dilated. It is open or patulous and the examining finger may, in some cases, be introduced as far as the internal os. In this form of tear the conical shape of the cervix may be preserved if no marked inflammatory change has taken place.

In the ordinary bilateral laceration which fails to unite there is **eversion of the cervical mucosa.** The mucous membrane lining the cervix is turned out (Figs. 336, 440) and is irritated by rubbing against the vaginal wall. The irritation of the cervical mucosa causes **increased secretion** from the cervical glands (Fig. 437). Infection leads to **endocervicitis,** acute and chronic, and this inflammation may bring about destruction of the mucous membrane, which is then replaced by scar-tissue. The rolling out of the lips of the cervix may progress to such an extent that the notch between the lips, which is one of the signs of laceration, is obliterated—so that the cervix appears as a round ball (Fig. 552).

Frequently there is much **scar tissue** covering the inner portions of the cervical flaps, and a thick wedge of scar-tissue in the angle of the tear on each side. The ducts of the cervical glands become obstructed by the inflammation and scar-tissue contraction and small cysts are thus formed, causing nodules in the cervix (Figs. 559, 560). These small cysts feel like shot of various sizes in the cervix. This indurated and nodular condition may lead to an erroneous diagnosis of malignant infiltration. If these nodules be punctured and then pressed upon, a thick glairy mucus is extruded, leaving a small cavity. In some cases, the cervix is riddled with these cysts, a condition known as **cystic degeneration** or cystic disease of the cervix. **Subinvolution** of the uterus is a secondary result of laceration of the cervix. The uterus remains large and heavy and drags on its supports. Another secondary change is **hypertrophy** of the cervix (Fig. 560). Owing to the chronic inflammation and chronic congestion and the cystic disease, the cervix gradually enlarges and becomes heavy and sinks downward and forward in the pelvis.

In some cases, however, the supposed enlargement and elongation is only an **apparent hypertrophy.** Even in the cases in which there is considerable hypertrophy it appears to be more than it really is. This deceptive condition is due to eversion of the lacerated portion of the cervix and descent of the uterus and reduplication of the vaginal wall. That this is the true condition may be shown by putting the patient in the knee-chest posture, when the uterus will gravitate out of the vagina toward the abdominal cavity and the point of attachment of the vaginal wall to the cervix, and the amount of cervix below that, may be seen. Another fact brought out by this examination in the knee-chest posture is that there are many cases of **laceration of the vaginal vault** that appear, in the ordinary examination, to be laceration of the cervix only. Owing to the sinking of the uterus and reduplication of the vagina, the tear appears to be wholly in the cervix. When the patient is put in the Sims posture, or better still the knee-chest posture, it is seen that the tear extends past the cervix and involves the vaginal vault. In either of these conditions, trachelorrhaphy and not amputation is the proper treatment.

Still another effect of a deep cervical laceration and the chronic irritation resulting there from, is the predisposition to the development of **cancer** of the cervix. This danger is apparently doubted by some authorities but it is a real danger and must be kept in mind.

Laceration of the cervix as seen several months or years after the injury is usually accompanied by one or more **complications,** such as chronic endometritis, retroversion, or loss of support in the pelvic floor.

Symptoms and Diagnosis.

The symptoms depending on the laceration itself and on the resulting subinvolution and inflammation are numerous, though none are distinctly characteristic of cervical laceration. The symptoms are nearly all due to the complications rather than to the tear itself.

There is usually a **vaginal discharge,** or leucorrhoea, due both to the cervical injury and the accompanying endometritis. When there is a preponderance of cervical secretion in the discharge, it is jelly-like and sticky and may be pulled out into long threads, and it is hard to detach from the cervical canal.

Menstrual disturbances usually accompany laceration of the cervix but they are due largely to the subinvolution and endometritis. They consist of painful menstruation and increased menstrual flow.

Backache and **dragging pains** in the pelvis are usually present in severe laceration but they, like the menstrual disturbances, are to be attributed largely to the complications such as laceration of pelvic floor, subinvolution, endometritis, and salpingitis.

Dyspareunia may be present in a case of laceration of the cervix and the probability of its occurrence is increased if retroversion is present.

Sterility may be caused by a cervical tear, the increased secretion retarding the progress of the spermatozoa or the cicatrical contraction causing stenosis. **Abortion** occasionally results from an old cervical injury.

Reflex symptoms in distant organs are sometimes excited by cervical injury. A familiar example is the increased nausea and vomiting of pregnancy, often seen in cases of severe laceration and irritation about the cervix. In many of these cases the cervix is tender, and pressure upon it excites stomach distress. In most of such cases an application of silver nitrate solution (4%) or cocaine solution (10%) to the cervix will give much temporary relief, indicating that the trouble is reflex from the sensitive cervix. Among the reflex disturbances sometimes due to a lacerated cervix, come also stomach disturbances in the non-pregnant, persistent neuralgia and headaches (particularly headache at the vertex) and a general nervous irritability.

The reflex influence of cervical injuries has no doubt been greatly over-estimated by some writers, and affections have been attributed to such injuries that really had no connection with them or were at most only aggravated by them. Laceration of the cervix is frequently accompanied by **poor general health** which may occasionally be due to the local and reflex disturbance from the cervix, but which is usually due to some complicating disease.

On vaginal examination the **notch** in the cervix may be distinctly felt and also the enlargement and the cystic condition when present. If there is a deep tear, the anterior and posterior **lips** may be made out. When the cervix is exposed to view through a speculum the amount of **eversion** of the mucous membrane may be seen and also any area of **erosion** caused by the irritating discharge. The bivalve speculum may distort the cervix and make it appear somewhat more widened and changed in shape than it really is. This slight distortion, which however is not of much importance ordinarily, may be avoided by using the Sims posture and the Sims speculum.

In some cases the flaps have rolled outward so far that there is no notch or distinct flaps to be seen. The cervix appears simply as a round ball (Fig. 552) instead of showing two distinct lips. By catching each side of such a cervix with a tenaculum-forceps, near the point that was formerly the external os, and bringing these points together (Figs. 441, 442), it may be seen that the cervix has been torn into two lips, and also some idea may be gained of the depth of the tear and the appearance of the cervix when repaired.

Laceration of the cervix with chronic inflammation must be distinguished from the following conditions:

a. Erosion of the cervix. In simple erosion, the conical shape of the cervix is preserved (Fig. 439). An erosion is often present with laceration as a result of the irritating discharge. It then appears around the everted mucosa as an irregular reddened inflamed-looking area.

b. Ulcer of cervix. In ulcer without laceration the conical shape of the cervix is preserved. Also, an ulcer shows destruction of the epithelial covering and has a depressed base and raised margin.

c. Chronic endocervicitis without laceration. In most severe cases of chronic endocervicitis, there has been laceration. But there are certain cases of endocervicitis without laceration, in which the mucosa becomes pushed out and everted from the inflammatory swelling, and the condition has somewhat the appearance of laceration. Such an appearance has lead to an erroneous diagnosis of previous pregnancy. In these cases the cervix as a whole preserves its conical shape, the principal ditsurbance being about the external os, which may appear as a slit instead of as a round opening and may be surrounded by swollen everted mucosa.

d. Cancer of cervix. Usually the differential diagnosis is easy. In some cases, however, when the cervix is deeply torn and nodular from cysts, it may be impossible to exclude cancer without a microscopic examination of an excised piece from the suspicious area.

With a lacerated cervix are frequently found one or more **complications**—chronic endocervicitis or subinvolution or chronic endometritis or retroversion or prolapsus uteri or chronic salpingitis or chronic pelvic cellulitis or chronic oophoritis.

All the lesions present in a case should be determined as far as possible before operative treatment is undertaken, for some of them may require treatment at the same time.

Treatment.

A laceration of the cervix does not necessarily cause symptoms nor require treatment. It is only when accompanied by certain conditions or complications, mentioned below, that it requires treatment. The treatment for a lacerated cervix is repair.

Trachelorrhaphy.

The operation for repair of a lacerated cervix is known as "trachelorrhaphy." It was devised by Emmet and, together with Emmet's operation for repair of the pelvic floor, stands as a representative of the careful study given to pelvic diseases by that splendid clinician.

Indications. A lacerated cervix when examined after several months or years, may present either of the following conditions:

a. A small notch on one or both sides, the remainder of the cervix being normal (Fig. 332). Such a cervix does not require repair, as it causes no symptoms.

b. A deep notch on one or both sides, the lips being soft and of normal size and without irritation (Fig. 334). Such a cervix does not ordinarily cause any disturbance. Occasionally, however, the scar-tissue in one or both angles causes local tenderness and reflex disturbance. In such a case the laceration should be repaired.

c. The cervix presents large infiltrated lips, with everted mucous membrane, cystic formation, an irritating discharge and spots of erosion (Figs. 439, 440). There may be no well-defined flaps or lips, simply a globular appearance of the swollen cervix (Fig. 552) with a slit-like os, surrounded by an irregular area of everted mucosa, granulation spots and scar-tissue, the whole covered more or less with a muco-purulent discharge. Such a cervix should be repaired, not only on account of the troublesome symptomes rsulting from it but also because it predisposes to the development of cancer.

I wish to emphasize, however, that the simple fact that a cervix has been lacerated is not an indication for operation. Operation is indicated only when there are troublesome local conditions which other measures fail to relieve.

Contra-indications. The contra-indications to this operation are the same as the contra-indications to repair of the pelvic floor (see chapter v).

Preparations. The preparations for the operation may be divided into preparation of patient, preparation of instruments and dressings and preparation of operator and assistants. The **preparation of the patient** is both local and general. When the cervix presents

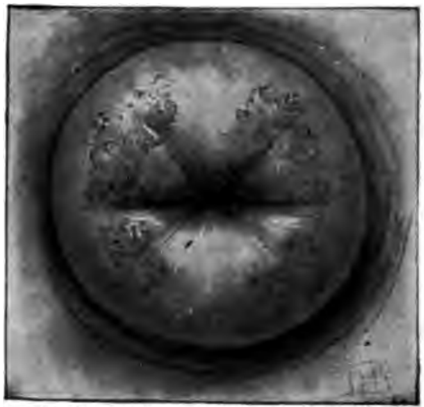


Fig. 552. A Lacerated Cervix in which there is so much eversion that the Cervix appears as a round ball. (Kelly—*Operative Gynecology*.)

erosion or ulceration or cysts or marked infiltration or a purulent discharge, it should be subjected to preparatory treatment as follows:

a. Give a hot antiseptic douche two or three times daily.

b. Puncture the cysts and touch the cavities with strong silver nitrate solution or other antiseptic.

c. When there is marked congestion and infiltration, bleed the cervix by multiple punctures once or twice weekly. Draw off one or two tablespoonfuls of blood each time and follow the bleeding by a tampon soaked in boroglyceride or ichthyol-glycerine. Direct the patient to remove the tampon in twelve to twenty-four hours and then continue the hot douches until the next office treatment. By this method the cervix may, in the course of a few weeks, be reduced considerably in size and put in much better condition for repair.

d. Treat the complications, such as retroversion and endometritis.

e. Give laxatives and tonics as necessary to put the patient in good condition generally.

f. Before operating for repair of the cervix the patient should be carefully examined, that all lesions present may be determined and taken into consideration in the treatment and prognosis. It may be found that the laceration of the cervix is only a small part of the patient's trouble and that her principal symptoms are due to malposition of the uterus or to loss of support in the pelvic floor or to endometritis or to salpingitis or to appendicitis or to a pelvic tumor. Many

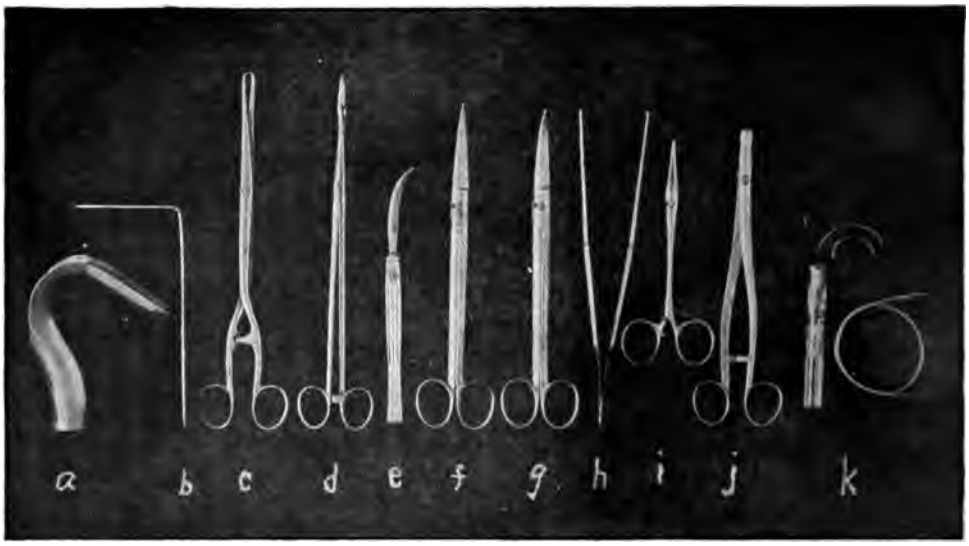


Fig. 553. Instruments for Repair of the Cervix: a. Edebohl's self-retaining speculum, to which the required weight is attached by a small hook; b, right-angled vaginal retractor (have two); c, long tenaculum-forceps (have two); d, vaginal dressing-forceps for sponging (have two); e, bistoury; f, long straight scissors; g, long curved scissors; h, long tissue-forceps; i, hemostat-forceps (have eight); j, Sims' needle-holder; k, number 2, 20-day catgut (have six tubes) and silkworm-gut (have eight strands) and strong cervix needles (have four). These needles should have sharp trocar-points, so as to easily penetrate the hard tissue of the cervix.

bitter disappointments and so-called failures have followed this operation, and other operations also, because the operation was expected to remove symptoms that were really not dependent on the lesion attacked. Such a mistake may be avoided by examining the patient carefully, and giving to each lesion present its due importance in the production of the complex clinical picture.

Another reason for ascertaining carefully all lesions present is that some other lesions may be corrected at the same time that the cervix is repaired, for example, the uterus may be curetted or a malposition corrected or the pelvic floor repaired.

In preparing for the operation on the cervix avoid the menstrual flow for ten days after the operation — the best time for the operation being four to ten days after menstruation.

The antiseptic preparation of the patient is the same as for repair of pelvic floor.

The preparation of instruments and dressings is the same as for Abdominal Section. The instruments required for trachelorrhaphy are shown in Fig. 553.

The preparation of the operator and assistants is the same as for Abdominal Section (see chapter xv), except that the use of rubber gloves is not so imperative.

Steps in the operation. After the patient is anesthetized and brought to the edge of the table (Fig. 573) and the vagina scrubbed the same as for curetment (Fig. 574), then proceed by the following steps:

1. Make a careful bimanual examination, under anesthesia, of the uterus and tubes and ovaries. When the bimanual examination is finished, introduce the self-retaining speculum and expose the cervix and catch it with a tenaculum-forceps.

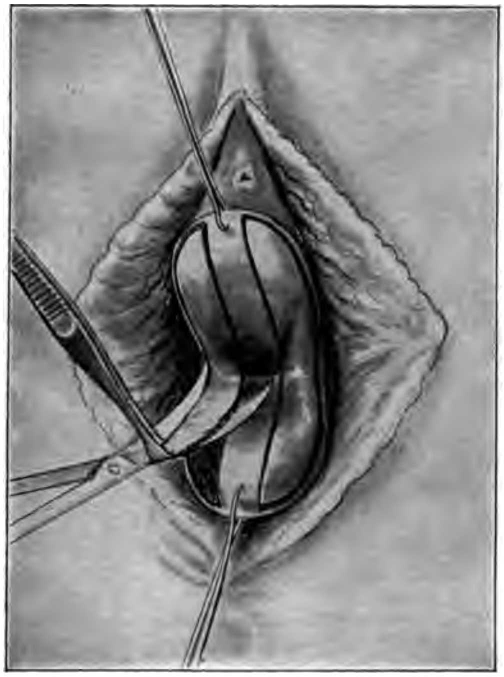


Fig. 554. Areas for Denudation Outlined by incision with the knife. This shows also the Method of Denuding with the scissors. (Hirst—*Diseases of Women.*)

2. If chronic endometritis or subinvolution is present, curet the uterus. When the cervix is to be repaired immediately after curetment, no gauze need be placed in the uterus.

3. Outline, by incision with the bistoury, the area to be denuded, leaving in the center of each lip a strip about a third of an inch wide, to form the new cervical canal (Figs. 554, 557). The strip of tissue to be left should be wide enough so that no stricture will result, after the healing and involution. Watch this point particularly, as some stenosis, requiring dilatation, sometimes follows trachelorrhaphy. It is a good plan to leave the strip a trifle wider at the external os (Fig. 557).

The area of denudation should include all the area of everted mucous membrane and scar-tissue, and should extend slightly outward on the vaginal surface of the cervix so as to give a wide surface of denudation for approximation.

4. Denude. A very good way is to first make an incision deep in the angle of each side (Fig. 556). This should extend through the scar-tissue into healthy tissue. Then catch the lower angle of the strip to be removed from one side of the lower lip and, while holding this with the tissue forceps, clip it loose with the scissors, straight or curved as preferred (Fig. 554). This process of cutting is continued all the way to the base of the flap. The upper part of the same side of the cervix is treated the same way, and then the other side of the cervix. Beginning below diminishes the inconvenience from the bleeding. Special care should be taken to remove all scar-tissue from the angles. Cysts in the area of denudation should be excised. If the surfaces are brought together with cysts in them, the operation is liable to do more harm than good, as the cysts may continue to develop in their buried situation and produce reflex disturbances. If cystic areas cannot be readily excised so as to permit of good approximation for trachelorrhaphy, the areas of cystic degeneration should be removed by Schroeder's partial amputation, explained later.

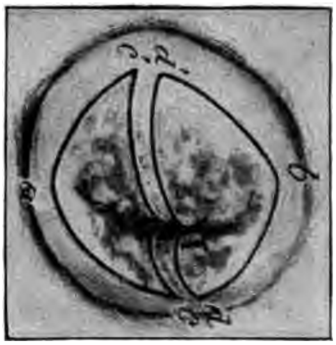


Fig. 555. The Area of Denudation outlined on a Rough Lacerated Cervix. The angles of the tear are situated near a and b. The mucosa to be left to form the new cervical canal, lies between the lines d-d' and c-c'. (Thomas and Munde—*Diseases of Women.*)

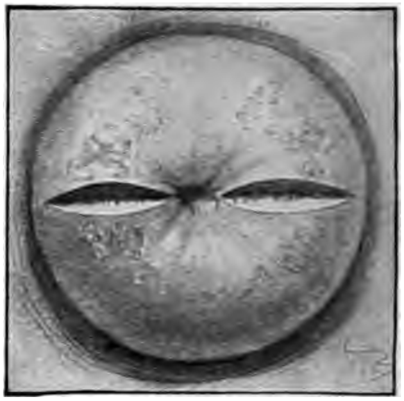


Fig. 556. Incision through the Scar-tissue at the angles of the laceration. (Kelly—*Operative Gynecology.*)

For denuding, some prefer a knife, some a straight scissors and some a curved scissors. The "hawk-bill" scissors of Skene are very convenient for biting the scar-tissue out of the angles of the tear.

5. Introduce the sutures. After the denudation is complete, the cervix is cleansed with the antiseptic solution, and then the sutures are passed. The first suture is introduced at the upper angle of the wound, as shown in Fig. 557. As

each suture is passed its ends are caught in a hemostatic-forceps and held out of the way. The next suture is passed $\frac{1}{4}$ to $\frac{1}{3}$ of an inch below the first, and so on down to the end, as many as are needed for that side. The sutures on the other side are then passed in the same manner. When all the sutures are in place the cervix is washed off with the antiseptic solution and all clots are carefully sponged away from the angles of the tear. The sutures are then tied, beginning with the one first passed. All the sutures of one side are tied and then those on the other side (Fig. 558). The line of approximation is then examined to see if any superficial sutures are needed. Frequently one or two superficial sutures will be needed to secure accurate approximation. The sutures, if of silkworm-gut, are then cut long—about an inch from the knots. If the silkworm-gut ends are cut shorter they are likely to stick the vaginal wall and cause irritation. If after denudation there is much bleeding from the denuded angle of the tear, the suture at the angle may be tied as soon as passed.

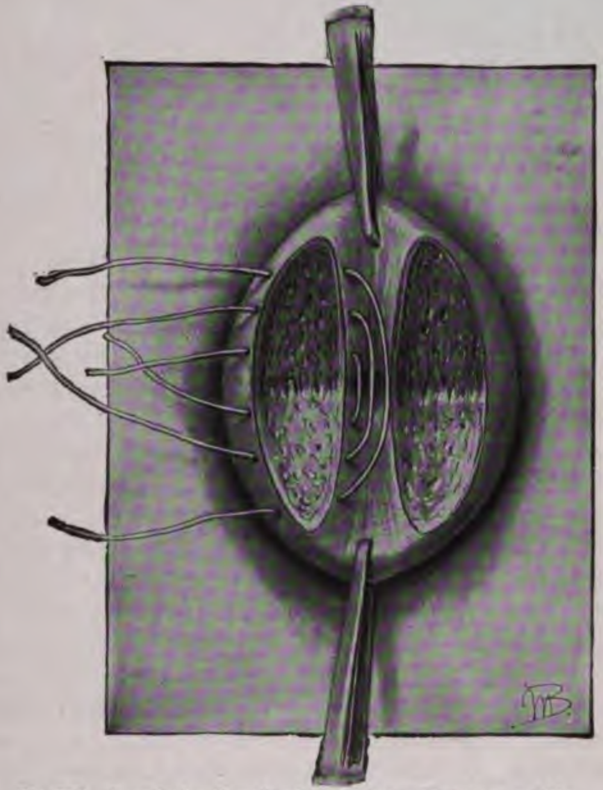


Fig. 557. Denudation Completed and Sutures Passed on one side. (Kelly—*Operative Gynecology*.)

6. Replace the uterus. The uterus is necessarily pulled down a good deal during repair of the cervix and the fundus may have gone backward. After the cervix is repaired the speculum should be removed and the uterus replaced to its normal position by bimanual manipulation (Fig. 582).

A strip of antiseptic gauze is then packed lightly into the vagina and the vulva is covered with a sterile dressing of cotton or gauze, held in place by a T-bandage.

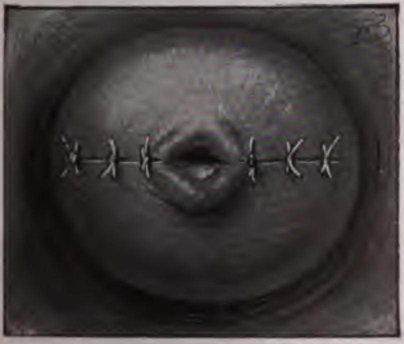


Fig. 558. Sutures Tied—Operation Completed. (Kelly—*Operative Gynecology*.)

In this operation, for keeping the field clear of blood, I employ sponging with cotton-balls wrung out of bichloride solution (1-5000) and held in long forceps, with occasional washing out with the hot bichloride solution. If preferred, continuous irrigation may be employed, with occasional sponging.

For suture material in the cervix, I prefer silkworm-gut, except when the pelvic floor is to be repaired at the same time. Then an absorbable suture is desirable, and chromicized catgut (that will last twenty days in the tissues) is satisfactory. No suture is advisable here that will not remain at least ten days in the mucosa. Even when the pelvic floor and cervix are repaired simultaneously, it is often just as well to use silkworm-gut in the cervix and leave it in place four to six weeks. When the pelvic floor is firmly healed, place the patient in the Sims posture, carefully introduce the Sims speculum and remove the cervical sutures.

If trachelorrhaphy is carried out in the dorsal posture, there is no difficulty in tying the sutures. In the Sims posture there may be considerable difficulty, necessitating the use of perforated shot for fastening them.

Silver wire is good suture material for the cervix, but it is no better than silkworm-gut and is decidedly more inconvenient to handle.

Silk is poor suture material for the cervix for it soon becomes soaked with fluid and permeated by bacteria, and acts as an irritant in the tissues.

When there is a **stellate laceration**, the expedient to be 'adopted depends on the situation and extent of the lacerations. If the principle laceration is bilateral, the other being slight and consequently of little importance, the latter may be disregarded. If the third laceration is deep and close to one of the lateral tears, the small intervening piece of tissue may be excised and the laceration converted into a simple bilateral one, which is repaired in the usual way. When the third tear is deep and near the center of the anterior or posterior lip, it may be denuded and repaired first, and then the lateral tears repaired as usual. Sometimes in a bilateral laceration there is a marked **disproportion between the lips,** one lip being much larger than the other, making accurate approximation impossible by the usual means. When the difference is not marked it may be equalized by extending the angle of excision into the longer lip. When the disproportion is marked, a wedge-shaped piece may be excised from the longer lip and the wound closed, and then the two lips approximated by the ordinary operation. Another method is to trim down the large lip by cutting the end and sides and inner surface. That of course leaves no mucous lining for the new cervical canal. However, an extra width of lining for the new canal is left on the other lip and this prevents union of the surfaces where the canal should be. If the lips are greatly hypertrophied from cystic disease, partial amputation, as described below, is preferable to trachelorrhaphy.

After-treatment. The genitals should be kept covered with a large sterile dressing of cotton or gauze. Do not catheterize the patient unless there should be retention of urine.

A bowel movement should be secured the second or third day, and daily after that. The gauze packing may be left in two days. It is then removed, and thereafter a hot bichloride douche (1-5000) given once or twice daily, depending on the amount of discharge.

After the first week, the patient may be allowed to get up and walk about, as rest in bed after the first few days is not necessary for the healing of the cervix. In many cases, however, it is best to keep the patient in bed two or three weeks for the benefit of associated diseases. In "run-down," nervous and worn-out women, this combination of the rest-cure with the operation is of great benefit, and in some of them the rest in bed with good nourishment and relief from care, probably contributes as much as the cervical repair to the improvement attained.

The sutures are removed in two weeks. The most convenient way to remove the sutures is to place the patient in the Sims posture, introduce the Sims speculum, expose the cervix, catch an end of a suture with forceps, pull it down until the knot comes into view or can be felt with the point of the scissors, and then cut the loop. When it is supposed that the sutures are all out, remove the speculum, place the patient in the dorsal posture and make a digital examination to see if all the sutures are really out. A suture missed by inspection is easily felt in the digital palpation.

Sexual intercourse should be postponed till six weeks after the sutures are removed.

Failure to secure the desired result from the operation may be due to:

1. Want of necessary preparatory treatment.
2. Infection, which of course spoils the operation and may lead to serious periuterine inflammation.
3. Insufficient removal of the scar-tissue in the angles, or the leaving of cysts somewhere in the area of denudation.
4. Too much encroachment upon the area left for the cervical canal, causing subsequent stenosis with retention of contents and dilitation above the constricted area.
5. An incomplete diagnosis. Trachelorrhaphy will not relieve the symptoms of lacerated pelvic floor, prolapsus uteri, adherent retroversion, chronic salpingitis or the various other diseases that may exist in the pelvis. To operate for a lacerated cervix without a thorough examination and diagnosis, as is done in some cases, is to invite failure and disappointment.

The physician is often asked if the cervix will not tear again at the next labor. It may and it may not. Very frequently it does not tear to any considerable extent. A cervix which has been repaired will dilate better and be less liable to an injurious tear than one that is the seat of cystic disease and dense scar-tissue.

Partial Amputation.

When many small cysts have formed in the everted and infiltrated surfaces of the cervix, as shown in Figs. 559 and 560, excision of the cystic area (partial amputation of the cervix) is preferable to regular trachelorrhaphy. Of course, when there are only a few cysts they may be removed in the regular denudation for repair, but when the "cystic degeneration" is extensive, excision of the whole cystic area is advisable. The line of excision is made superficial or deep, as necessary to include the cystic portion of the cervix (Figs. 560, 561).

Steps in the operation. The preparations are the same as for repair of the cervix and the same instruments are required. When the cervix is exposed with the speculum, it is grasped with tanaculum-forceps, one being fastened in the anterior lip and the other in the posterior lip. The cervix is then split on each side, sufficiently to permit access to the cystic area of each lip (Fig. 562-A). In a deeply-lacerated cervix this may not be needed. An incision is then made across the inner surface of the base of the anterior lip, extending through the diseased layer (Fig. 562-B). An incision is then made across the front margin of the anterior lip and is continued down in the cervical tissue to the other incision just mentioned (Figs. 562-C, 561).

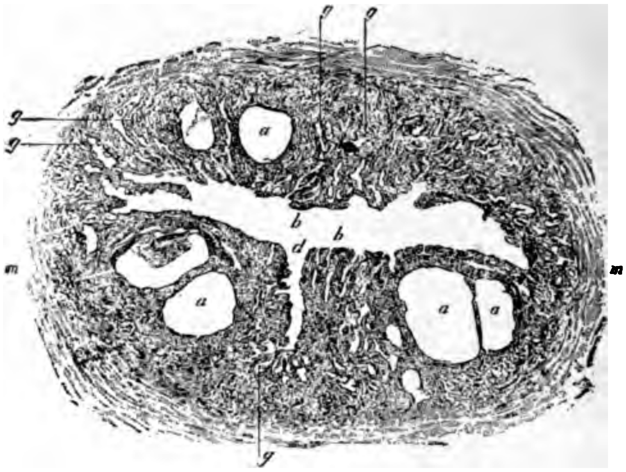


Fig. 559. Cross-section of a Cervix which is the seat of "Cystic Degeneration." a. Dilated gland-cavities, forming small cysts. b. The cervical canal. (Pryor, after Cornil—*Pelvic Inflammation.*)

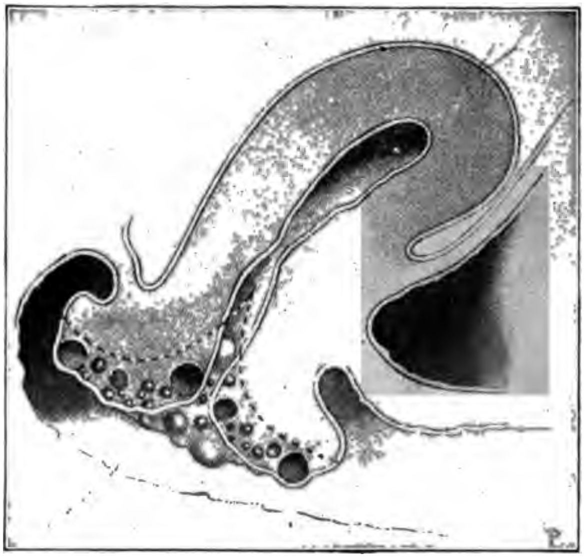


Fig 560 Representing Cystic Degeneration of the Cervix. This shows also a line marking the area to be excised in partial amputation for cystic disease. (Dudley—*Practice of Gynecology.*)

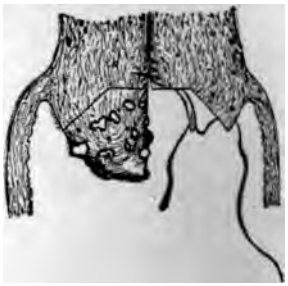
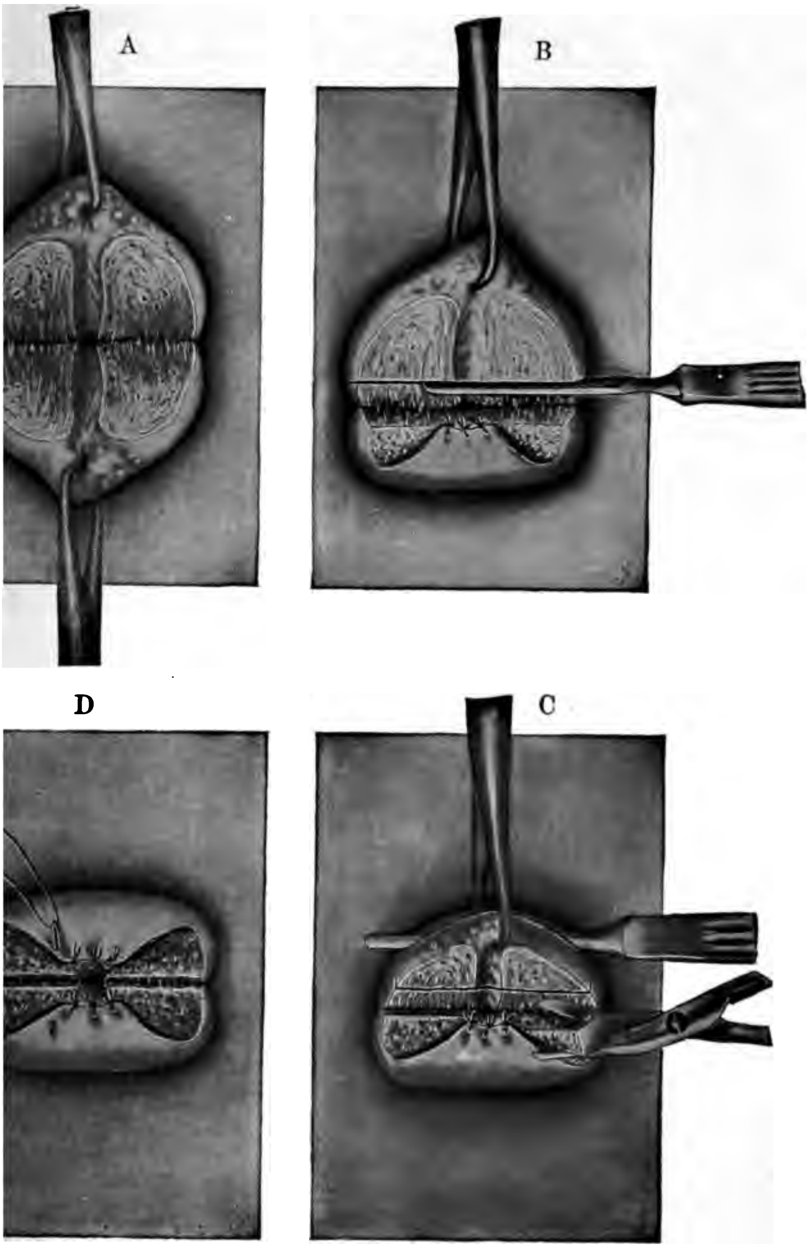


Fig. 561. Showing the line to follow in Excision of the Cystic Area—Called also "Partial Amputation" and "Schroeder's Operation." (Pryor—*Gynecology.*)

The tissues lying to the inner side of the knife are thus removed, and a similar procedure is carried out on the posterior lip. Sutures are then passed in the anterior lip as shown in Figs.



rtial Amputation of the Cervix (Schroeder's Operation). A. The cervix split from side to side.
ccess to the base of the cystic area. B. Making the incision across the base of the cystic area in
In the posterior lip the cystic area is already excised and some sutures passed. C. Excising
in the anterior lip. Also trimming the posterior lip to allow of better approximation. D. Both
ised and the tissues trimmed for approximation. This shows also the method of suturing. (Pryor

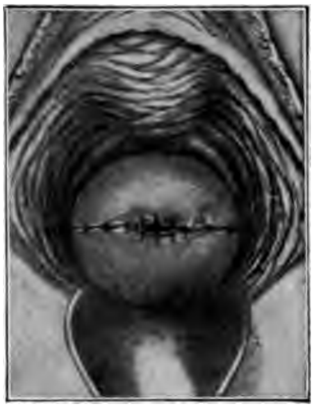


Fig. 563. Partial Amputation of the Cervix. Sutures Tied. (Pryor—*Pelvic Inflammation.*)

561 and 562-D, bending the raw surface on itself, so that the two portions are approximated and will grow together. Similar sutures are passed in the posterior lip. Any raw surfaces left at the sides of the anterior or posterior lips are closed by suturing (Fig. 563).

This operation removes most of the diseased tissue and reduces the size and weight of the cervix. At the same time any troublesome scar-tissue in the angles of the laceration may be removed.

IDIOPATHIC HYPERTROPHY OF CERVIX.

The term "idiopathic hypertrophy" of the cervix is applied to enlargement of the cervix independent of laceration and the resulting inflammation. As this form of hypertrophy results principally in elongation it is sometimes spoken of as "elongation of cervix." It is a rare affection.

Etiology, Pathology, Diagnosis.

The cause of this marked increase of tissue and elongation of the cervix is not definitely known. In some cases of prolapse of the uterus, the vaginal walls which prolapse at the same time drag on the cervix and elongate it, but not to the extent here contemplated. It may occur in the married or unmarried. It occurs oftenest in nullipara. It is held by some that masturbation is an important etiological factor, as it is in hypertrophy of the labia minora. In regard to age, it occurs most frequently between the ages of fifteen and thirty-five.

There is an increase of tissue in the cervix but in such a way that the cervix is greatly increased in length without a corresponding increase in width. If the hypertrophy takes place only in the vaginal portion of the cervix, it presents the condition shown in Figs. 298 and 299, the long cervix projecting along the vagina or even outside of the vagina a considerable distance. The body of the uterus and the vaginal walls remain in approximately normal position. If the hypertrophy is confined to the supravaginal portion, the vaginal walls, both anterior and posterior, are pushed downward by the same, as in prolapse (Fig. 300). The body of the uterus, however, remains in about the normal position. If the hypertrophy is confined to the intermediate portion, the anterior wall and the base of the bladder will be pushed down as in prolape, the posterior wall remaining stationary (Fig. 301). Retroversion of the uterus and more or less prolapse are usually present also, and are caused by the dragging of the heavy cervix and the vaginal walls.

The patients complain of dragging weight in the pelvis and of a protrusion at the mouth of the vagina. There may be menstrual disturbance and leucorrhoea.

Examination reveals a mass with the characteristics previously mentioned. From PROLAPSUS UTERI it is distinguished by the body of the uterus being in approximately normal position. From UTERINE TUMOR projecting into the vagina, it is distinguished by its form and by its central cavity. From INVERSION of the uterus, it is distinguished by the body of the uterus being in about the normal position and by its central opening.

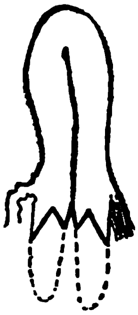


Fig. 564. Regular Amputation of the Cervix. Showing the Wedge-shaped Lines of Excision. (Skene—*Diseases of Women.*)

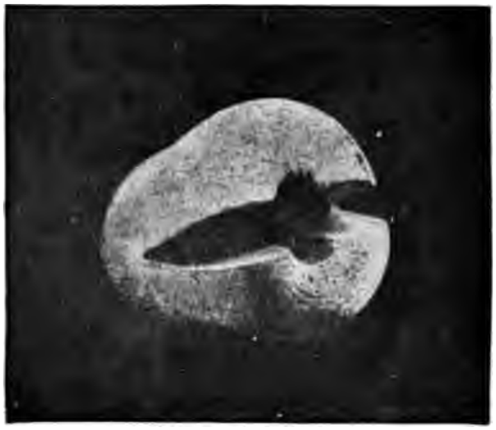


Fig. 565. Amputation of the Cervix. First step—splitting the cervix. (Skene—*Diseases of Women.*)

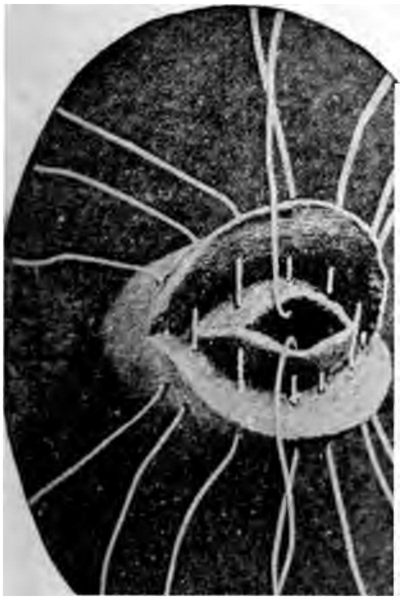


Fig. 566. Regular Amputation of the Cervix. Excision of tissue completed and Sutures passed. (Skene—*Diseases of Women.*)

Treatment.

The treatment is amputation. The preparations for amputation and the instruments required, are the same as for repair of the cervix.

Regular Amputation of Cervix.

In this operation enough of the cervix is amputated to reduce it to the normal size. The preferable method is to make the incision in the form of a wedge, as shown in Fig. 564, so that the surfaces will approximate well and unite without excessive scar formation. This is frequently designated as the "wedge-shaped" amputation of the cervix.

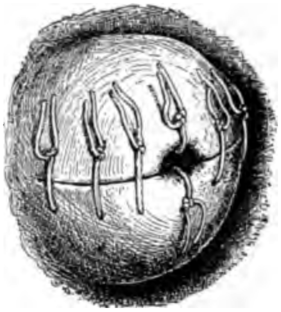


Fig. 567. Sutures tied, operation completed. (Skene—*Diseases of Women.*)

The long cervix is first split laterally into an anterior and posterior lip (Fig. 565). The required amount of tissue is then removed, as shown in Fig. 566. The sutures are then introduced (Fig. 566) and tied (Fig. 567).

The after-treatment is the same as for trachelorrhaphy.

CERVICAL POLYPI.

Cervical polypi is the term applied to small non-malignant tumors found in the cervix uteri. They are usually simple adenomata of the cervical mucosa and hence are frequently designated as "mucous polypi." Occasionally, a small fibromyoma of the cervix will become pediculated and project from the cervix, constituting a polypus.

The principal symptoms are bleeding and leucorrhoeal discharge. It is surprising what troublesome and persistent bleeding will sometimes be occasioned by a small polypus in the cervix.

On digital examination, the small polypus may often be felt as a small soft mass projecting from the cervix or obstructing the external os (Fig. 342). In some cases the polypus is so soft that it is not noticed on palpation.

In the examination through the speculum, the polypus is seen (when low enough in the canal) as a small rounded red mass, projecting from the external os or filling the os.

The important thing in the diagnosis is to distinguish beginning malignant disease from simple polypus. Not infrequently in malignant disease of the cervix small projections form within the cervical canal and appear at the external os, presenting almost the same appearance as the simple polypus. Whenever there is the least doubt as to the nature of the polypus, it should after removal be submitted to microscopic examination.

The treatment is removal. The little mass of tissue may usually be grasped with the long dressing-forceps and twisted off. An astringent-antiseptic application is then made, and a tampon or vaginal packing applied. If there is much bleeding it is well to pack the cervical canal firmly with antiseptic gauze, to be removed in forty-eight hours.

ACUTE INFECTED ENDOMETRITIS.

This is acute inflammation due to bacterial invasion of the endometrium and adjacent tissues in a uterus not recently pregnant. Metritis and endometritis in the recently pregnant uterus (puerperal sepsis) is an obstetrical subject.

Under the above title I include the changes taking place deeper in the uterine wall (metritis) as well as those strictly in the endometrium.

Etiology and Pathology.

This is usually due to infection with the gonococcus as ordinarly this is the only germ that will, on mere contact, implant itself and grow and spread upward, in the non-puerperal genital tract. Gonorrhoea involves the cervix in a large proportion of the cases of vaginal gonorrhhoea. Its extension upward from the cervix to the endometrium may be spontaneous or induced. Spontaneous extension upward may take place immediately following the infection of the cervical mucosa or the inflammation may remain limited to the cervix for weeks and months, with the possibility of the extension upward at any time. During or immediately following the menstrual flow is the favorite time for the progress upward of the gonococci. This fact can in many cases be clearly shown by questioning the patient closely as to just when the first evidences of endometrial infection appeared. Induced extension of the gonorrhoeal infection upward may be caused by treatment designed to check the inflammation. On this account, in all local treatment of gonorrhoeal endocervicitis, great care should be taken to avoid the immediate vicinity of the internal os. Also, sounding of the uterus or other intra-uterine instrumentation in cases of gonorrhoea of the cervix (acute, chronic or latent), is likely to lead to gonorrhoeal infection of the endometrium. Infection of the endometrium with other inflammatory bacteria (staphylococcus, streptococcus, colon bacillus, etc.) is usually due to examination with a sound in the uterus or other intra-uterine instrumentation, the germs being carried in from outside the body or from the vagina or from the cervical canal. Endometritis so caused, was rather frequent formerly, when the uterine sound was passed by touch, but not so now since the uterus is not so often sounded, and when it is sounded care is taken to do the sounding in an aseptic way. Still, in some cases infectious germs lurk in the cervix without decided symptoms, and in spite of precautions the endometrium may be infected.

Occasionally the ordinary pus germs may extend upward in a pathological discharge (due to chronic endometritis). In this way a simple endometritis may eventuate in an infected endometritis, without the intervention of pregnancy or instrumentation. This is probably a rare occurrence in the presence of normal functional activity and normal tissue resistance. The period of the menopause, however, with its nutritive disturbance and its diminished tissue resistance, seems to offer exceptional facilities for the spontaneous extension upward of ordinary pus germs. Hence, the form of acute endometritis so comparatively frequent in the aged, and producing such special conditions (due to the senile condition of the tissues) that it has been given the special name "senile endometritis." Senile endometritis may, as explained later, be either simple or infected, and on account of the senile lowering of resistance a simple endometritis is likely to become an infected one by spontaneous extension upward of pus germs.

Practically the whole endometrium is evolved. The germs lie on the surface and also penetrate into the glands and into the interglandular tissue. Later, they penetrate into the underlying muscular tissue to a greater or less extent. There are the usual phenomena of inflammation, congestion, swelling, serous and cellular infiltration into the tissues, and a muco-purulent discharge consisting of glandular secretion, serous exudate, dead leucocytes and exfoliated epithelium, with occasionally some blood. There is a marked tendency of the infection to spread to the Fallopian tubes.

Symptoms and Diagnosis.

In the gonorrhoeal cases, after the vaginitis or cervicitis has continued a few days or several weeks, as the case may be, the patient complains of "cramps" in the lower abdomen and of soreness in the pelvis when walking, and of increased vaginal discharge. Sometimes the pain is quite severe and occasionally the patient is confined to bed for a few davs. There may be moderate fever (101 to 102), but the fever is rarely marked as in puerperal endometritis. By close questioning, we can usually obtain a history of symptoms indicating gonorrhoea within the last few weeks or months.

In the form due to ordinary pus germs, the symptoms are about the same, with a history of some local treatment (intra-uterine instrumentation) or of simple endometritis, causing discharge, in which the germs multiplied and thus extended upward. If there is any discharge from the urethra or vulvo-vaginal glands, a spread-preparation of it is made on a cover-glass or slide, which can later be stained and examined for the gonococcus.

Digital and bimanual examination show that the body of the uterus is tender on pressure. If the disease is still limited to the uterus, there will be no decided tenderness outside the organ. If the trouble has extended to the adnexa, there will be marked tenderness and perhaps a mass about the tube involved. Through the speculum, the muco-purulent discharge may be seen coming from the cervix. Also, the condition of the vaginal walls, as to whether or not they are still inflamed may be thus determined.

The diagnosis of acute endometritis rests upon the following points:

1. Subjective symptoms. Moderate pain and tenderness of recent origin, in the lower abdomen, with vaginal discharge and some fever.

2. Tenderness of body of uterus on bimanual examination.

3. Muco-purulent discharge coming from the uterus, as shown by speculum examination.

4. Absence of other evident lesion to account for symptoms. Corroborative of this diagnosis, is a history of recent vaginal inflammation or objective evidence of the same or of inflammation of the urethra or vulvo-vaginal glands or cervix. The diseases that cause confusion in diagnosis are: acute vaginitis, acute endocervicitis, acute pelvic inflammation and hemorrhage in the pelvis.

In ACUTE VAGINITIS, there is little or no pain or tenderness in the lower abdomen, the uterus is not particularly tender on bimanual examination (the tenderness being in the vaginal walls), and speculum examination shows enough inflammation of vaginal walls to account for the symptoms (soreness and discharge).

In ACUTE ENDOCERVICITIS, there is little or no tenderness in lower abdomen, the body of uterus is not particularly tender on bimanual examination and speculum examination shows a profuse glairy discharge from the cervix.

In ACUTE PELVIC INFLAMMATION, the pain is more constant and sharp and extends more into the sides. Bimanual examination shows that the tenderness is situated about the adnexa of one or both sides, instead of in the body of the uterus. Also, there is usually some indication of a mass of exudate to one side of the uterus.

Of course, any one of the three diseases just mentioned, may be found with an acute endometritis and then the symptoms will be intermingled. After having established the fact that the patient has an acute endometritis, the next thing to do is to decide, if practicable, what kind of an endometritis it is—whether gonorrhoeal or ordinary. If we can find nothing to indicate that the trouble is gonorrhoeal, we assume that it is caused by the ordinary pus germs. In questioning the patient as to evidence of gonorrhoea, it is well in all but exceptional cases to avoid arousing her suspicions that the trouble may be such. Such suspicion on her part will do no good and may do much harm.

The points indicating that the trouble is gonorrheal are:

a. History pointing to recent gonorrheoa, particularly symptoms pointing to acute vaginitis and metritis without other cause.

b. Evidences of previous inflammation of urethra (redness and pouting-out of urethral mucous membrane at meatus and tenderness about urethra) or previous inflammation of a vulvo-vaginal gland (redness about opening, discharge from duct and induration and tenderness of gland).

c. Acute or chronic endocervicitis without other cause.

d. Gonococci found in discharge from urethra or vulvo-vaginal glands or cervix or endometrium.

e. Trouble coming on shortly after marriage without apparent cause.

f. In doubtful cases it is well to send for the husband (without the wife knowing it) and ascertain from him if he has any evidence of gonorrhoea, new or old.

TREATMENT.

No abortive or quickly curative treatment for gonorrhoeal or other acute forms of endometritis has been found. There is no probability of immediately dangerous absorption from the uterus (as in puerperal endometritis), but there is great probability of the inflammation becoming chronic and persisting for months or years, and sooner or later involving the tubes. In many cases tubal complications develop in spite of the most careful treatment, though the treatment undoubtedly helps to prevent such complications in other cases. The principal factor in preventing the bacterial invasion is the resisting power of the tissues. The treatment should be of such character as to increase this tissue resistance and at the same time lessen the irritation in and about the infected uterus.

General measures. The pelvic congestion and the pain should be relieved as far as possible by general measures. The patient should be put to bed, if she is not there already, and kept in bed until the acute symptoms subside. Open the bowels well by some reliable purgative and then maintain one or two movements daily by a laxative, for example, one or two teaspoonfuls of Rochelle salt each morning in a glass of water one hour before breakfast. Enemata should be avoided in gonorrhoea an account of the danger of carrying the infection into the rectum. If there is much pain in the lower abdomen, use hot stupes or the hot-water bag. If this does not give relief, use the ice bag. If the pain is still troublesome or if the patient is restless, give mild sedatives internally.

Vaginal douches and applications. The hot vaginal douche, given according to the special directions in chapter III, clears the irritating discharge from the vagina and diminishes the pelvic soreness. It should be a weak antiseptic solution, the same as recommended in gonorrhoeal vaginitis. The length of the interval betewen douches will depend on the amount of remaining vaginitis and the amount of uterine discharge. Ordinarily, if the vaginal inflammation has about disappeared, every six hours will be often enough for the vaginal douche. If there is still decided vaginitis, the silver nitrate or protargol application and other measures for gonorrhoeal vaginitis are indicated.

No intra-uterine treatment is advisable in acute non-puerperal endometritis, whether gonorrhoeal or otherwise. Many kinds of intra-uterine treatment have been tried—intra-uterine irrigation, intra-uterine applications (weak, strong and medium), intra-uterine packings (medicated and unmedicated for drainage), caustics and curetment—and all apparently increase rather than diminish the chance of extension upward, which is the great danger. If it is apparent that the uterine cavity is not draining, i. e., that there is retention of pus within, then the cervical canal should be dilated sufficiently and a small rubber tube inserted for drainage. It should be arranged so that it will not slip out, for it is important that the drainage be free and constant. With free drainage and the carrying-out of the other measures mentioned, we have assisted nature to the full extent of our ability in preventing extension upward to the tube or outward through the uterine wall to the parametrium. Free drainage removes the pus as formed, and, as already explained, the use of any intra-uterine instrument whatever is likely to stir up irritation and increase penetration of bacteria and do more harm than it can do good. The use of soft suppositories containing a suitable antiseptic may eventually prove of real benefit in these cases (see page 349).

ACUTE SIMPLE ENDOMETRITIS.

This term is applied to certain acute changes resembling acute inflammation that appear in the uterine mucosa without bacterial invasion.

Etiology, Pathology, Symptoms.

This is a nutritive change and is due to pronounced acute congestion of the uterine mucosa, which is usually due to some acute disease such as pneumonia or typhoid fever or scarlet fever or to some severe shock to the nerves of the skin. as by an extensive burn or prolonged exposure to the cold or heat, or to suppression of the menses. Because of its frequent association with some of the exanthematous diseases it is sometimes called "exanthematous endometritis."

In some cases of the affection mentioned, there is intense congestion of the uterine mucosa, swelling of the tissues, serous or cellular exudate on the surface and out into the tissues, exfoliation of the cells on the surface and in the glands, and hemorrhage onto the surface and into the tissues.

The trouble is primarily uterine congestion, but sometimes the changes mentioned persist long after the congestion has subsided. The process may be accompanied with increased discharge, much pain and the usual symptoms of mild acute endometritis. This affection is rare but it is important as indicating that symptoms of acute inflammation may be present without infection—simply as a congestive and nutritive change.

Treatment.

The treatment is to keep the patient quiet, remove the causative affection as far as possible, relieve the pelvic congestion by purgatives, and give vaginal douches if there is troublesome discharge. If the trouble is due to suppression of the menses, hot sitz-baths and hot applications and hot douches are indicated, as described in chapter XIV. Sedatives should be given as required to relieve pain. It is important to avoid all intra-uterine instrumentation, for the condition of the interior of the uterus favors infection. If the patient's general health is restored, the disturbed endometrium usually takes care of itself, the damaged cells being cast off and normal conditions restored. Occasionally some source of intra-uterine irritation may remain and cause a chronic simple endometritis.

CHRONIC INFECTED ENDOMETRITIS.

This is chronic inflammation of the uterus due to bacterial invasion. The different germs have been mentioned when speaking of the various forms of the acute stage of bacterial invasion of the uterus. Chronic infected endometritis is known in its various forms as: chronic endometritis, chronic metritis, chronic catarrh of uterus, chronic gonorrhoeal endometritis and chronic septic endometritis.

Etiology and Pathology.

Chronic infected endometritis follows acute infected endometritis (either gonorrhoeal or septic). In some of the cases of acute inflammation of the uterus, the process does not disappear after the acute symptoms subside but remains for months and years, causing troublesome leucorrhoea and menstrual disturbances.

In the uterine tissues the serous infiltration of the acute inflammation is largely absorbed, but the cellular infiltration remains to a considerable extent and there is connective tissue formation. The germs keep up a constant irritation in the tissues, leading to chronic hyperemia of the endometrium and adjacent tissues. This chronic irritation and the increased blood supply causes hyperplasia of all the tissue elements. The cellular infiltration combined with the hyperplasia of the fixed tissue elements causes thickening of the endometrium. The infecting germs lie upon the surface and in the glands and in the interglandular tissue and even in the underlying muscular tissue. The chronic hyperemia gives rise to increased secretion from the glands, and this secretion combines with the leucocytes and epithelial cells and micro-organisms, and forms a muco-purulent discharge which as it passes through the cervix becomes associated with the tenacious mucous of that locality. The germs may disappear entirely after several months or several years, but the changed tissue then present may act as an irritant and keep up the inflammation as a simple endometritis. In fact, it is held by some that in ordinary chronic infected endometritis, the micro-organisms play only a small part.

The congestion and the described condition of the mucosa usually give rise to a hemorrhagic tendency. The hypertrophy or hyperplasia may progress to such an extent that the mucosa becomes many times its usual thickness. When the hyperplasia is so marked, it usually takes place unevenly, so that the surface is rough and nodular, giving rise to the name "fungous" endometritis. The normal endometrium is shown in Fig. 568. Chronic endometritis of the fungous form is shown in Figs. 569, 570. In this condition the hemorrhagic tendency is a marked feature, hence the name "hemorrhagic" endometritis. In some cases the masses project out from the surface and become pediculated and give rise to polypi. This condition is known also as "polypoid" endometritis. The gland-ducts become obstructed and retention cysts are thus formed. In the fungus and polypoid form of endometritis, the interstitial tissue in the endometrium undergoes decided increase and hence the condition is sometimes designated interstitial endometritis, in contradistinction to glandular endometritis, in which there is marked proliferation of the glands without corresponding increase in the connective tissue. After a long time the cellular infiltration largely disappears, new connective tissue taking its place, and this connective tissue contracts as the infiltration-cells between the fibers disappear. The glands are thus injuriously pressed upon and begin to undergo pressure-atrophy, their ducts are obstructed and cystic dilatation takes place. This process becomes more and more marked until there is great destruction of gland tissue and the condition passes into sclerosis of the uterus, described later, in which little remains of the mucosa but scar-tissue. The change from ordinary chronic endometritis to the condition of sclerosis takes several years, except

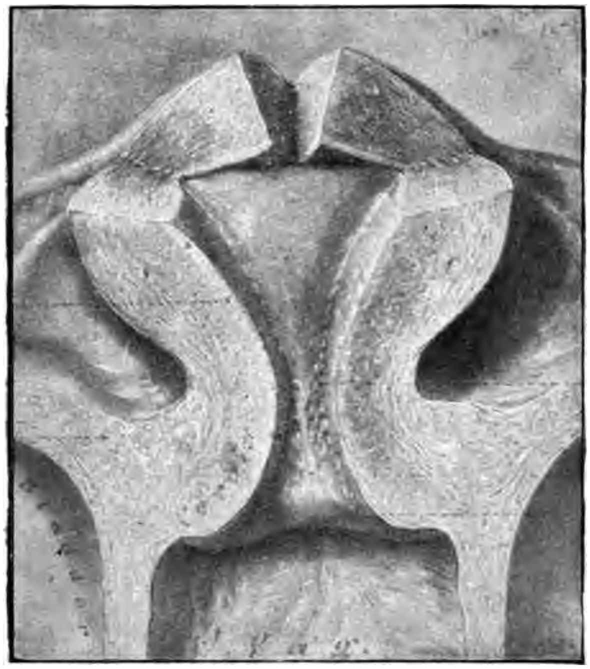


Fig. 568. A Normal Uterus divided from in front, showing the Smoothness of the Endometrium and also its relative Thickness. (Cullen—*Cancer of the Uterus.*)

in those cases in which the process is hastened by the use of destructive applications within the uterus.

Symptoms.

The patient comes complaining of a vaginal discharge (leucorrhoea) which she has had for several months or years, as the case may be. This may be the only symptom. Usually, however, there are marked menstrual disturbances—painful menstruation, increased menstrual flow and frequently irregular menstruation. When hypertrophy of the endometrium is a marked feature of the endometritis, the hemorrhagic tendency is likewise marked. The menses may last a week or ten days, and bleeding between times may appear. Hemorrhage is especially marked in the fungous or polypoid condition of the endometrium. A polypus thus formed, may give rise to sudden serious uterine hemorrhage. Occasionally the menstrual flow is diminished, but usually not unless atrophic changes are present.

Backache and weight in the pelvis and dragging pains very frequently accompany endometritis. The patient tires easily and can not do the work nor the walking that she formerly could. All these symptoms are, as a rule, much worse than menstrual period. Sterility is usually present if the endometrial changes are marked. Reflex disturbances may also appear,

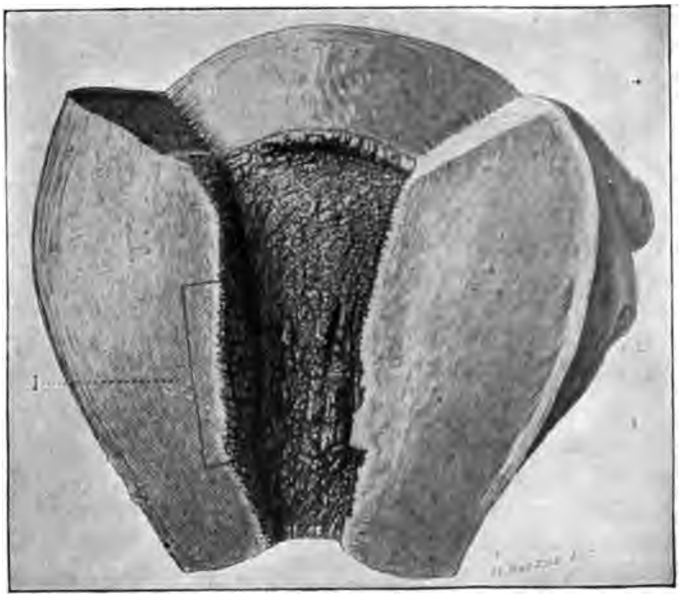


Fig. 569. Chronic Endometritis, polypoid or fungus form. The area from which the magnified portion (Fig. 570) was taken is indicated at (1). (Cullen—*Cancer of the Uterus.*)

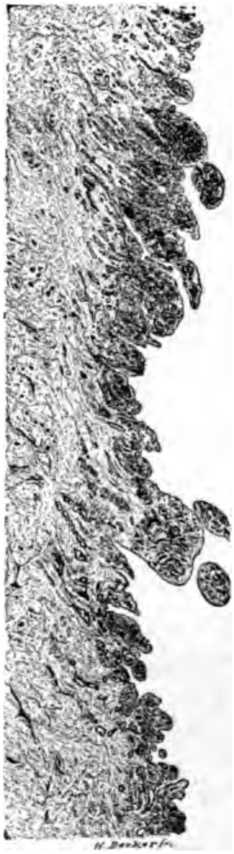


Fig. 570. A Section from the uterus shown in Fig. 569, highly magnified. (Cullen—*Cancer of the Uterus.*)

There are often also more severe symptoms due to some associated affection, such as salpingitis or malposition of the uterus. By questioning the patient it can usually be determined whether the acute infection was gonorrhoeal or ordinary septic inflammation. The questioning should always be conducted, of course, in such a way as not to arouse the patient's suspicion of disease in her husband. If the process has continued long, the uterus is generally increased in size, particularly so when the infection followed labor or abortion, with resulting subinvolution. In the examination, search should of course be made for tubal complications and other associated diseases. If salpingitis is present, it shows that infection has extended to the endometrium and thence to the tube.

On speculum examination, it is seen that the discharge comes from the uterus, for it is found about the external os and in the cervical canal. The amount of discharge coming from the uterus may be determined, if desired, by placing a tampon against the cervix and removing it after twelve to twenty-four hours. In chronic endometritis the discharge may be slight or free, and it is usually mixed with much cervical mucous. There is more discharge than can be accounted for by the cervical lesions present. If the uterine sound be introduced, the interior of the uterus is usually more sensitive than usual, bleeds more easily and is slightly increased in size—but sounding is rarely advisable.

The diseases which are most likely to be confused with chronic infected endometritis are as follows:

Endocervicitis. In endocervicitis, the cervix presents evidence of inflammation enough to account for the discharge, and there is no enlargement or tenderness of the uterus or evidence of tubal inflammation.

Chronic simple endometritis. In this there is no infection of the uterus and no tubal infection of intrauterine origin. Endometritis in a virgin is almost always of this character.

Subinvolution without infection, presents a large uterus with discharge and menstrual disturbance, but without any history of infection.

Tuberculosis of uterus. In this there are usually evidences of tubercular disease of the tubes and pelvic peritoneum. It resists the treatment for endometritis, and tubercular bacilli are found in the discharge or scrapings, or in tissues removed by curetment.

Malignant disease of the endometrium. In malignant disease, the apparent endometritis does not yield to regular treatment, and when the uterus is cleared out with a curet and the scrapings examined microscopically, malignant infiltration is found.

Treatment.

1. General measures. The patient should rest in bed as much as possible during the menstrual periods and also during any acute exacerbation of the trouble. Use purgatives and laxatives sufficiently to keep the bowels well open. Ergotin and hydrastis have some affect on the uterus and are indicated in hemorrhagic conditions and in hypertrophy. For the relief of pain at the menstrual period or at other times, the sedative measures mentioned under Dysmenorrhoea are employed. Sitz-baths taken just before retiring often give much relief to those patients complaining of pain in the back and sacrum and pelvis and down thighs, worse at the close of the day.

Look for any extra-genital disease requiring attention. Put the patient in the best possible general health. Correct any dyscrasia present. Poor blood from general diathetic disease often tends to keep up chronic inflammation in the uterus.

2. **Hot vaginal douches.** These should be given one to three times daily, depending on the amount of discharge and the amount of pain. The necessary details are described in chapter III (page 311).

3. **Intra-uterine applications.** In cases in which the inflammation is not severe, intra-uterine applications may be of benefit. In the hemorrhagic form, the hemorrhage may be lessened temporarily by these, as may also the muco-purulent discharge. The details of intra-uterine applications are explained in chapter III (page 346). The following medicines may be used:

Argent. nitrat., 4% to 20%.
Protargol, 2% to 10%.
Carbolic acid.
Tinct. Iodine.
Carbolic and Tinct. Iodine, half and half.
Copper sulphate, 10%.
Formol, 10% to 40%.

These applications to the endometrium may be made once a week. After the application, place a tampon soaked in protargol-glycerine or ichthyol-glycerine against the cervix. Then instruct the patient to lie down for several hours when she gets home, and remove the tampon at the next douche time.

Uterine pencils or bougies of protargol or of alum and iodoform may be used (page 349).

When using strong applications, such as carbolic acid or iodo-phenol, it is well to introduce a small-sized cervix-speculum past the internal os and make the application through it, to prevent the liquid being squeezed out in the cervix and producing a cauterizing effect with resulting stenosis at the internal os.

4. **Curetment.** If a short course of treatment by intra-uterine applications does not produce decided benefit, it should be discontinued and some more radical means employed.

Curetment for Chronic Endometritis.

In a large number of the cases of chronic endometritis, curetment is advisable as the first step in the treatment. In deep-seated chronic inflammation of the uterus there is a large amount of thickened tissue (Figs. 569, 570) which must be removed. In these severe cases, it is a waste of time to make applications or irrigations before this is done, as they do not penetrate the diseased mucosa suficiently to do any good. The curet removes the bulk of this diseased tissue. Then, if necessary later, applications may be made with the prospect of getting a decided effect from them.

The preparations for curetment are the same as for repair of the pelvic floor.

The instruments required are shown in Fig. 571. If it is desired to cleanse the uterine cavity by irrigation, instead of swabbing, add an intra-uterine irrigating tube. If a piece of the cervix is to be excised for microscopic examination, add a long sharp-pointed scissors, two strong cervix needles, a needle-holder and suture material.

If the operation is to be done at the patient's home, a kitchen table is arranged for it, as shown in Fig. 572.

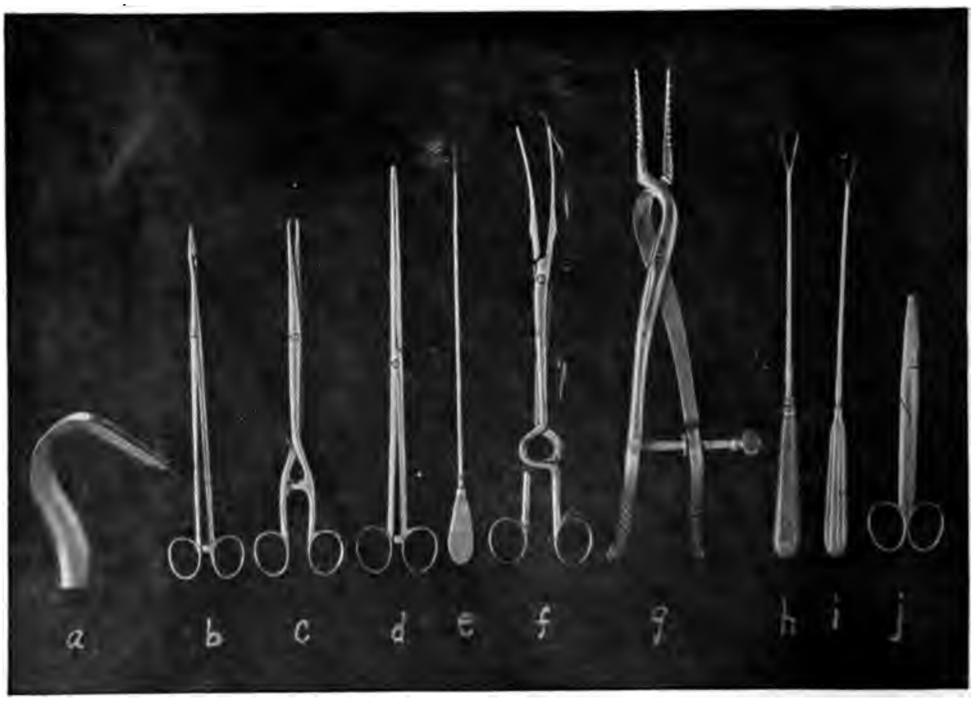


Fig. 571. Instruments for Curetment: a. Edebohl's self-retaining speculum; b. vaginal dressing-forceps, for cleansing vagina; c. long tenaculum-forceps, for holding cervix; d. uterine dressing-forceps, for swabbing within uterus; e. uterine sound (the bulbous end does not show distinctly in the photograph); f. small uterine dilator; g. large uterine dilator (Wathen's); h. sharp uterine curet with flexible shank, large size; i. sharp uterine curet, small size; j. short scissors for cutting gauze. If a piece from the cervix is to be excised for microscopic examination, add a long sharp-pointed scissors and suture material and needles and a needle-holder.

Steps in the operation. 1. The patient is anesthetized and placed in the dorsal posture, with the feet in the upright supports and the hips at the edge of the table (Fig. 573). The external genitals and adjacent surfaces are thoroughly scrubbed (having been shaved in the preparation before anesthesia) with boiled water and some liquid preparation of green soap, using pieces of absorbent cotton or a very soft brush. Then the vagina is vigorously cleansed with the soap solution, using cotton-balls held in long forceps and introducing two fingers into the vagina to spread out the walls and smooth out the depressions so as to permit thorough cleansing of the walls (Figs. 574, 575). Then cleanse the vagina and external genitals thoroughly with bichloride solution (1-2000), using the absorbent cotton.

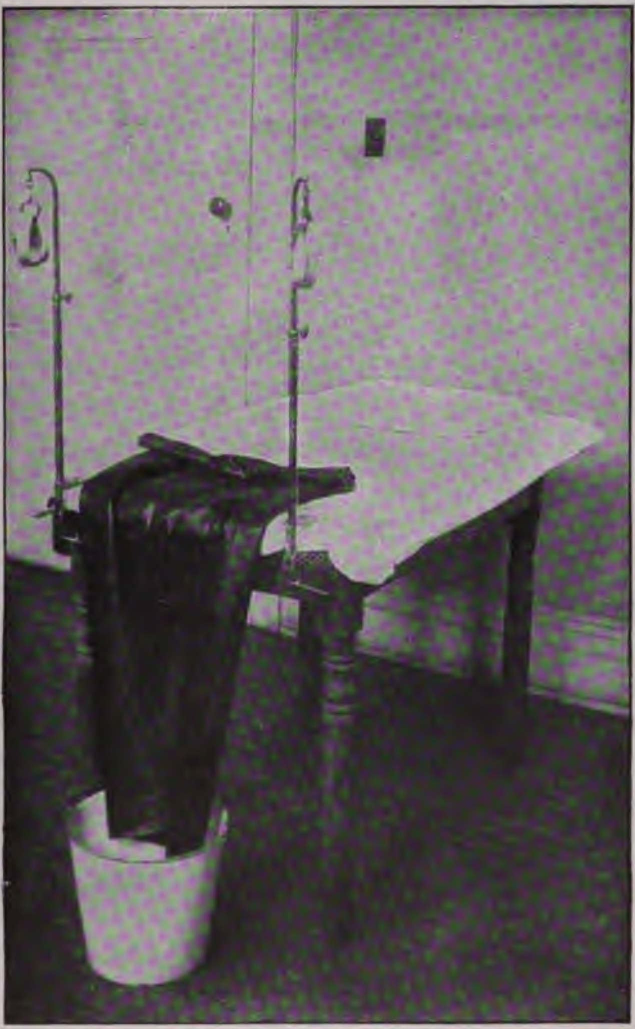


Fig. 572. A Kitchen Table Arranged for Curetment or other vaginal operation. The portable leg-holders can be carried in the satchel and are very convenient.

Then introduce the self-retaining speculum and attach to it a bottle containing enough water to furnish the required weight (Fig. 576) and surround the operative field with towels wrung out of bichloride solution (1-2000) or with towels dry-sterilized or with the sterile "perineal sheet" (Fig. 577). The bottle used for a weight is not sterile, consequently it must not be touched directly by the operator. If it is necessary for it to be hung on the speculum by him, he must grasp it with a sterile towel. During the operation it is entirely covered by the sterile sheet.

2. Swab out the vagina again with the antiseptic solution (at the same time swabbing out the cervical canal if it is sufficiently open), catch the cervix with the tenaculum-forceps and dilate it with the small dilator.

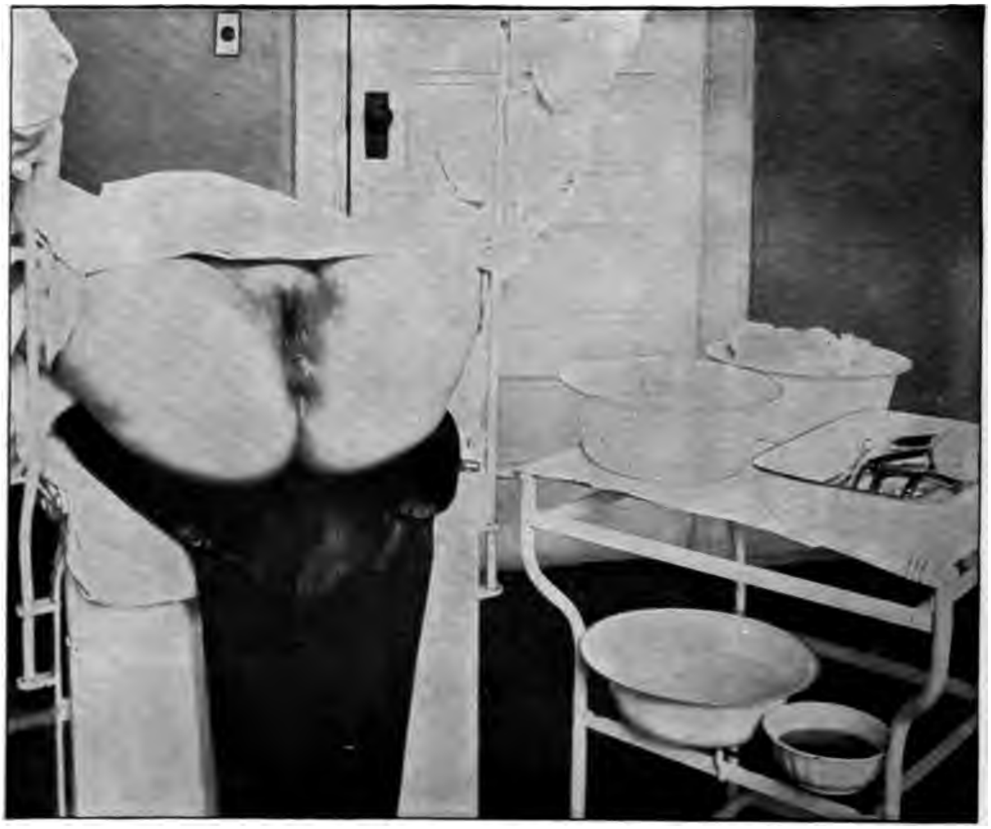


Fig. 573. The patient in position at the end of the table. After the patient is anesthetized, the feet are fastened in the leg-supports and the hips are brought over the end of the table.

The canal is now open so that the uterine cavity may be cleansed with the antiseptic solution, using cotton held in the uterine forceps. Then the large dilator is introduced and the cervix is thoroughly dilated (Figs. 578, 579). The dilatation should be carried out slowly and carefully, the direction of the dilatation being several times changed, to secure gradual dilatation in all directions and prevent rupture of cervix. The cervix should, in this manner, be dilated sufficiently to admit the large curet easily.

In certain cases in which the cervix is abnormal, it may suddenly tear at some point and the blade of the dilator will pass through the wall of the cervix into the peri-uterine connective tissue. To prevent this accident it is well to keep the set-screw at the handle between the blades, set so that there can be no sudden wide separation of the dilating portion of the blades. A dilatation of $\frac{3}{4}$ in. to $1\frac{1}{4}$ in. should be secured.

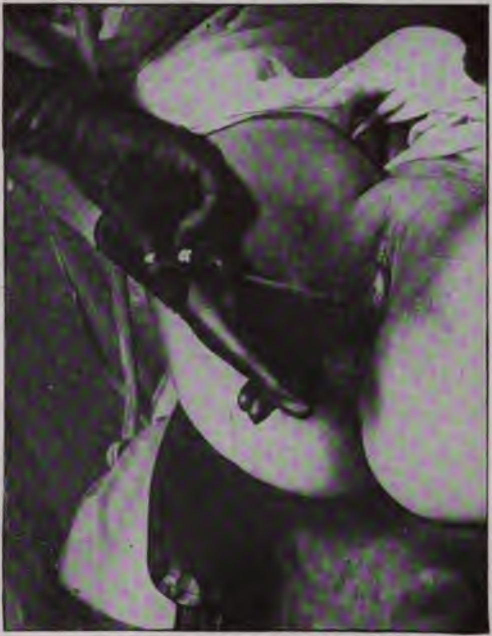


Fig. 574. Scrubbing the Vagina. The two fingers are introduced and spread apart, as shown in Fig. 575, so as to smooth out all folds.

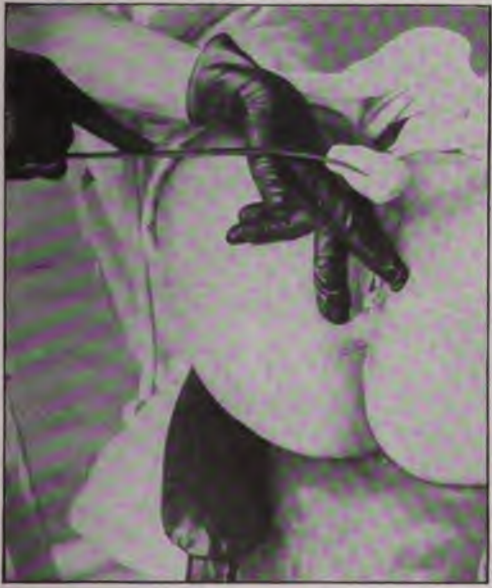


Fig. 575. Showing how the fingers are separated within the vagina. Showing also the long strong forceps holding cotton with which the vaginal walls are throughly scrubbed.

3. Cleanse the cavity again and introduce the large curet (Fig. 580) and clear out the softened endometrium. The curet should be held tightly between the thumb and fingers, in the same manner as a pen (Fig. 581). A mark on the handle indicates in which direction the cutting edge lies. The interior of the uterus should be gone over systematically, so that no part of the surface is missed. The pressure must be applied carefully. It must be firm enough to remove the softened diseased tissue, but not firm enough to remove any of the firm tissue beneath it. The fact that comparatively healthy firm tissue has been reached is indicated by the grating sensation imparted to the curet. As a rule this is easily recognized, and after some practice the uterus may be cleared out rapidly and safely. In exceptional cases, however, the wall of the uterus is diseased to a considerable extent and softened, and care is necessary to avoid penetration of the wall.

If the apparent inflammation has been of long standing, the scrapings should be saved and submitted to microscopic examination, that malignant disease or tuberculosis may be discovered, if present.

After the surface has been systematically gone over with the sharp curet, the debris is removed by swabbing with cotton in a forceps or by irrigation if preferred.

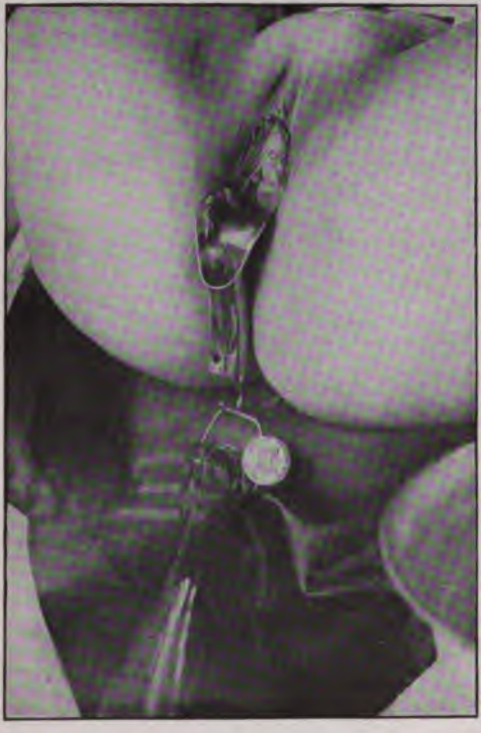


Fig. 576. Self-retaining Speculum introduced, and weight (bottle with water in) attached. The amount of weight may be varied as necessary for different patients by putting more or less water in the bottle.

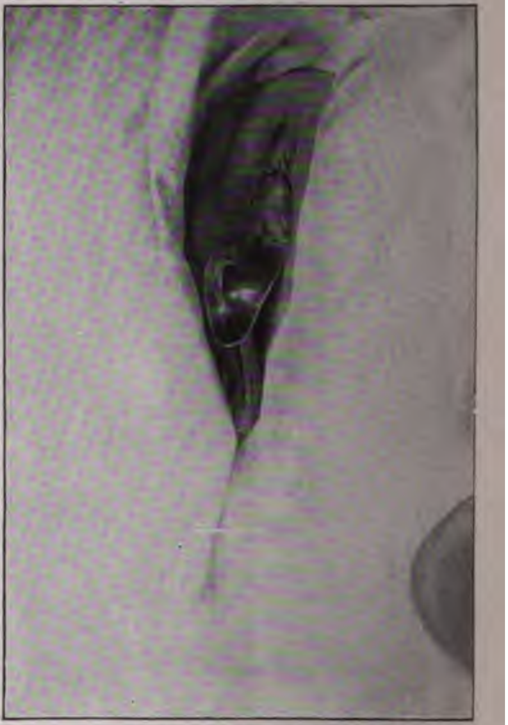


Fig. 577. Sterile "perineal sheet" arranged about the field of operation.

4. When the cavity is free of fragments, it is packed with antiseptic gauze, to maintain the dilatation of the cervix for forty-eight hours. If there is much bleeding it may be diminished by one or two applications of carbolic acid (95%) made to the endometrium before the packing. If the carbolic application is made, care must be exercised to prevent the vagina being burned by it.

5. After the uterine cavity has been packed, cleanse the vagina, introduce two fingers in the vagina, remove the speculum and bring the fundus uteri well forward by bimanual manipulation (Fig. 582). In the curetment, the uterus is drawn downward somewhat and the fundus sometimes goes backward. Unless the uterus is brought forward into normal position at the close of the operation, it is likely to remain in retro-displacement and cause trouble.

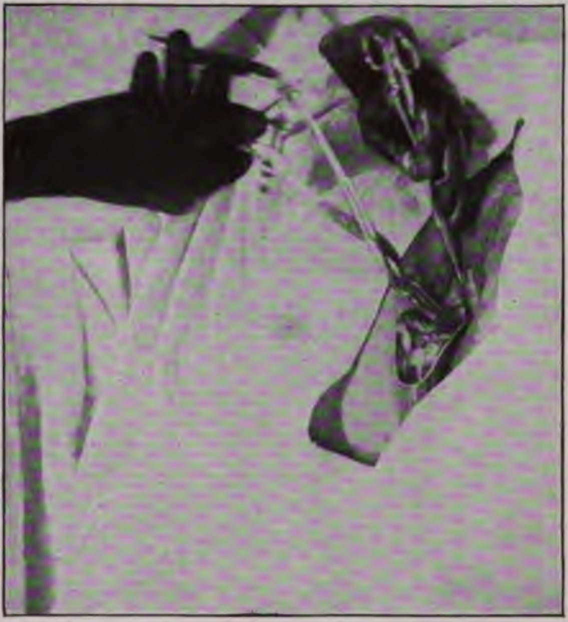


Fig. 578. Introducing the Large Dilator.

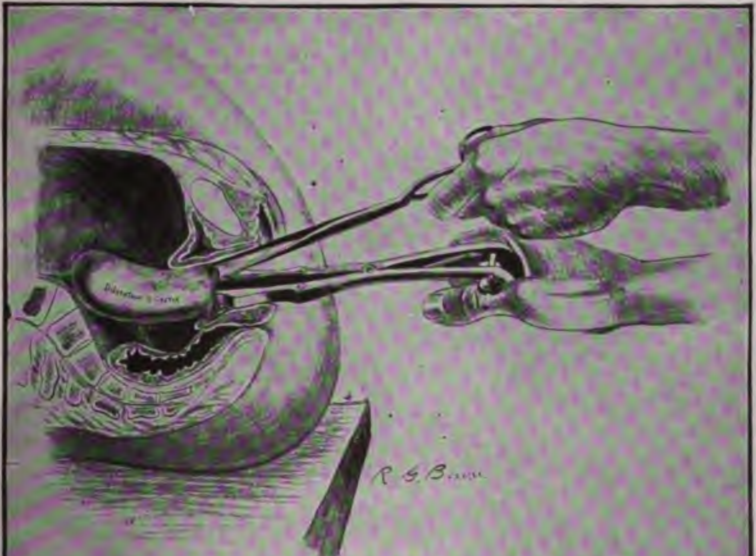


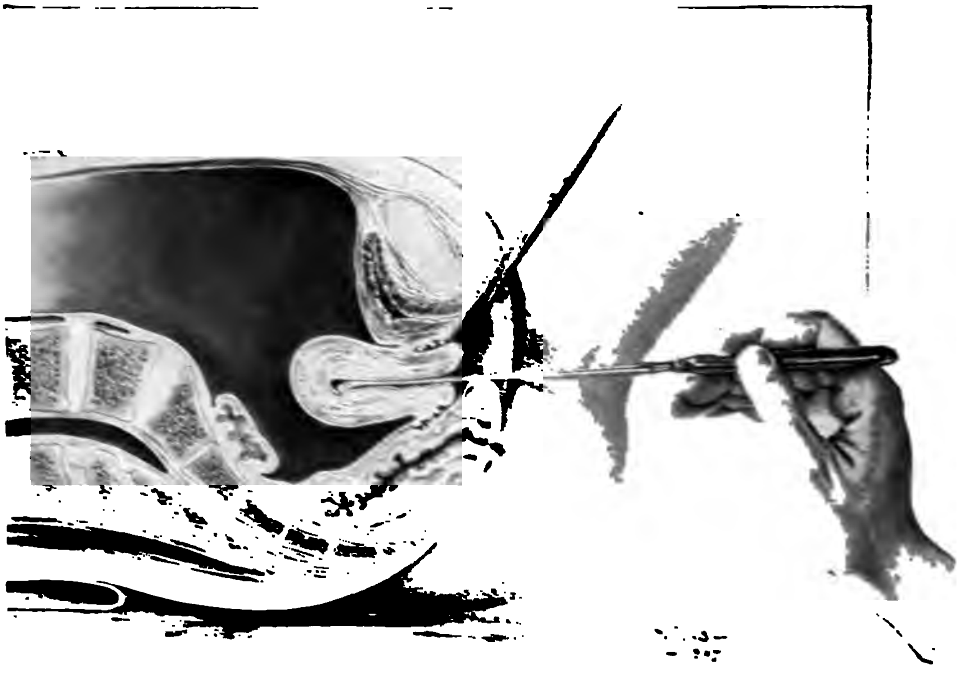
Fig. 579. The Large Dilator in Place. (Gilliam—*Practical Gynecology.*)

If it is desired to have the vaginal and intra-uterine packing all in one piece, so that it can be more easily removed later, the vaginal portion may be held in the palm of the hand (Fig. 583) during the replacement of the uterus.

At the same time that the fundus uteri is being brought forward (or before beginning the curetment, if thought preferable) a pelvic examination under anesthesia may be made.

In many of these cases of chronic endometritis, there are tubal or ovarion complications, the nature and extent of

Fig. [illegible].—Introducing the Curet.—This shows the form of the curet and also the manner of steadying the cervix with a tenaculum forceps.



[illegible] any gradation of force may be [illegible] any direction and the shank [illegible]

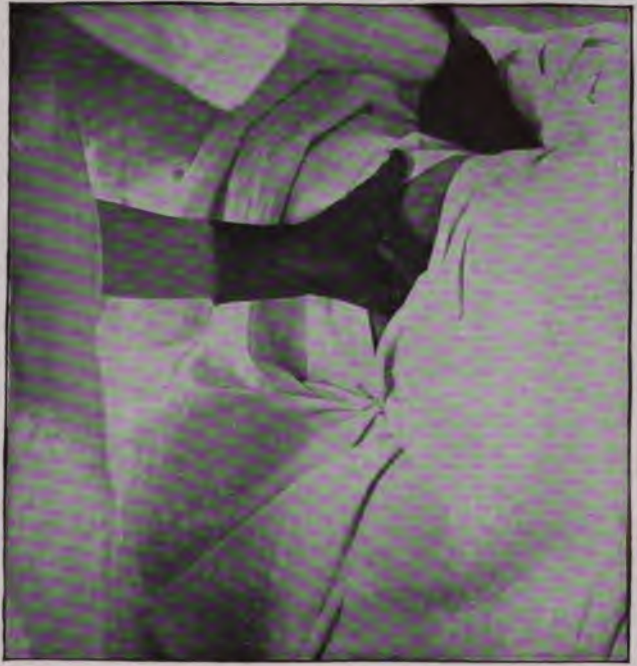


Fig. 582. Returning the Uterus to its Normal Position, after curetment, and making the Bimanual Examination under Anesthesia. The Examination under Anesthesia may be made immediately before the curetment if preferred.

which are best made out by examination under anesthesia. Again, a frequent complication of chronic endometritis is adherent retroversion, and it is important to determine exactly the environment of the uterus—whether it can be brought forward without danger, how firm and extensive the adhesions are and whether there is any collection of pus in the mass of adhesions or in the tubes.

6. When the uterus is in normal position, remove the tenaculum-forceps from the cervix, spread the vagina open with the examining fingers and pack the vagina lightly with gauze (Fig. 583). When this vag-

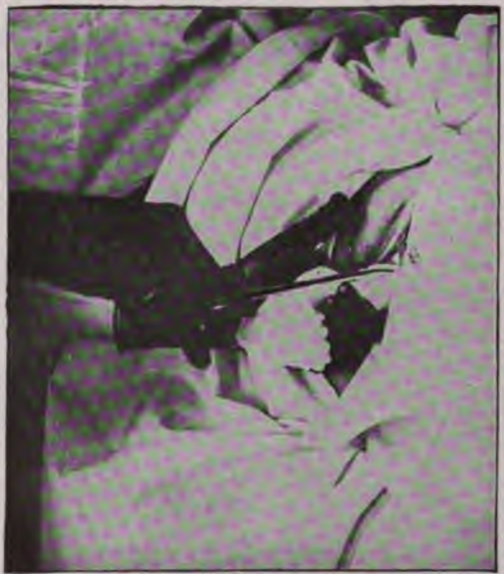


Fig. 583. Putting in the Vaginal Packing.

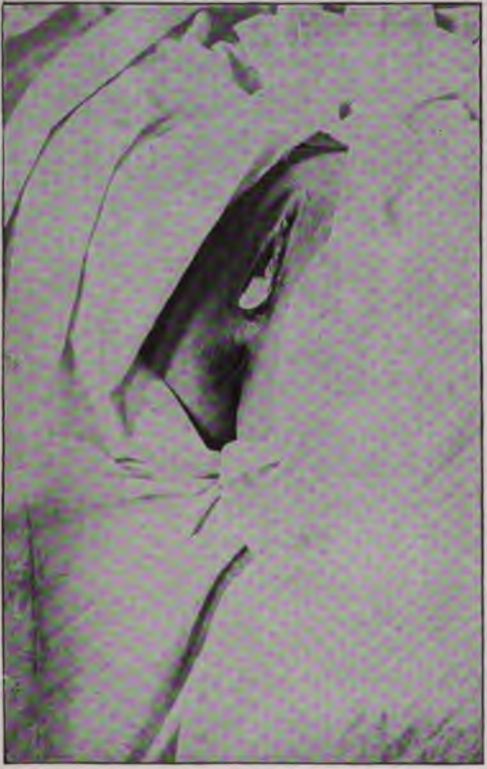


Fig. 584. The Vaginal Packing in Place, and the parts cleansed.

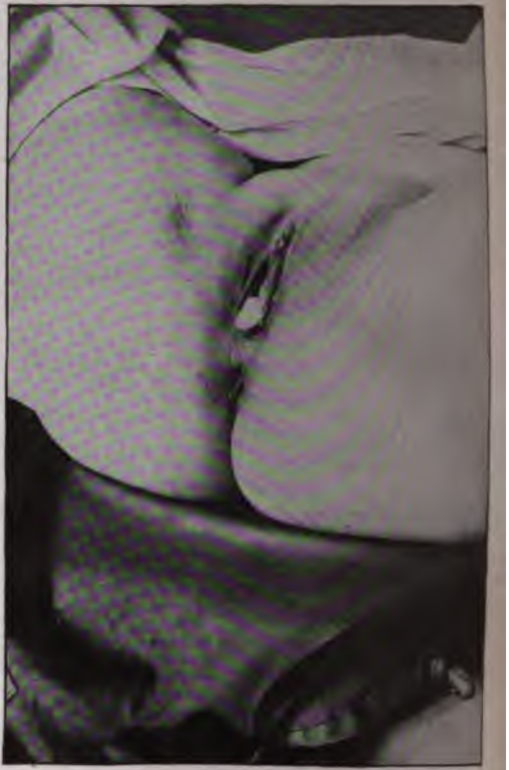


Fig. 585. The Sterile Sheet Removed, and the parts ready for the dressing.

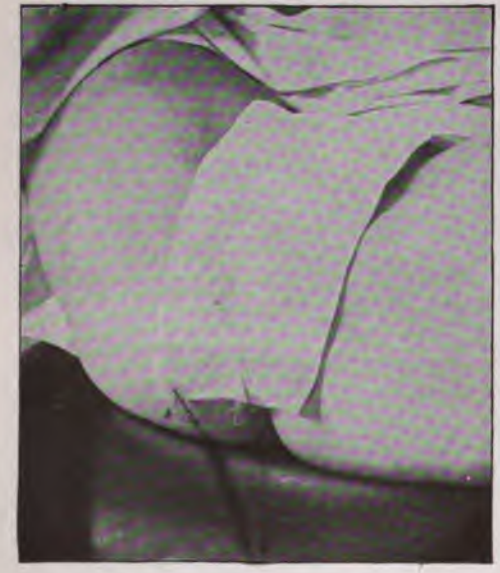


Fig. 586. The Vulvar Dressing. The Gauze Applied.

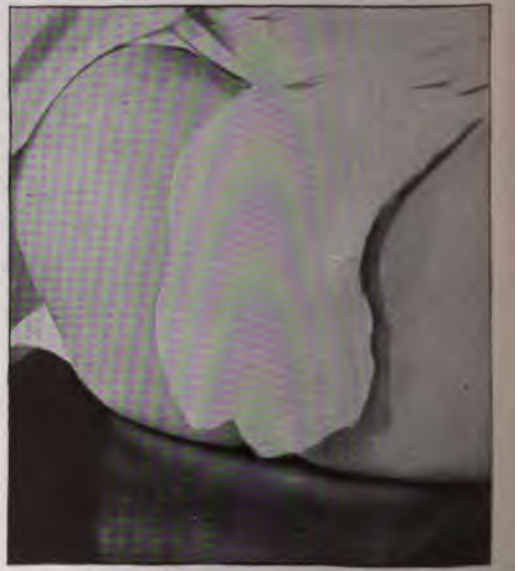


Fig. 587. The Vulvar Dressing. The Absorbent Cotton applied over the gauze.

inal packing is finished (Fig. 584), remove the sterile sheet (Fig. 585) and put on the dressing —first, a piece of gauze (Fig. 586), then a large piece of absorbent cotton (Fig. 587) and then the T-bandage (Fig. 588).

After the curetment, in chronic endometritis without active germs, the interior of the uterus is again covered with epithelium in two weeks (Fig. 589), and at the end of two or three months the whole endometrium is restored (Figs. 590 and 591). This new endometrial covering is supposed to come from the multiplication of the epithelial cells lining the deeper portions of the

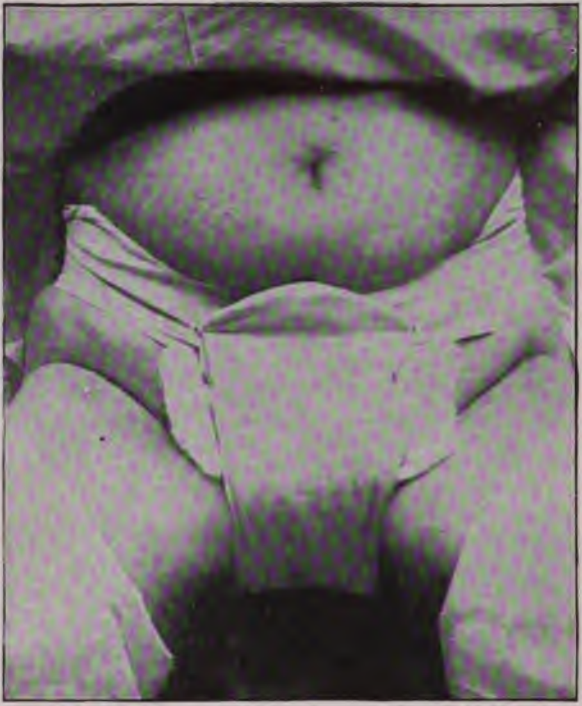


Fig. 588. The Vulvar Dressing. The T-bandage applied. Notice in Figs. 587 and 588 that the dressing covers the entire vicinity of the operative field, including the pubes.

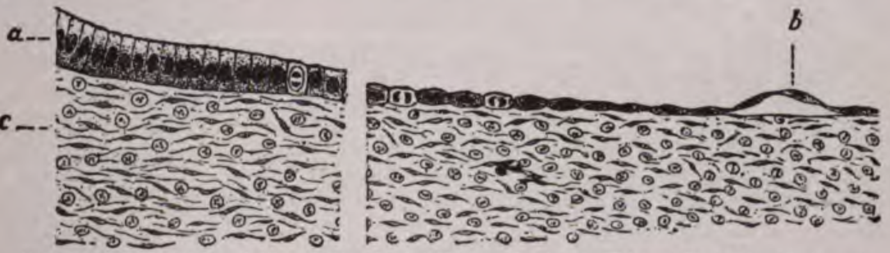


Fig. 589. Perpendicular Section of the Uterine Mucous Membrane, Thirteen Days After Curetment: a, b, epithelium, newly-formed. (Baldy—*American Text-book of Gynecology.*)

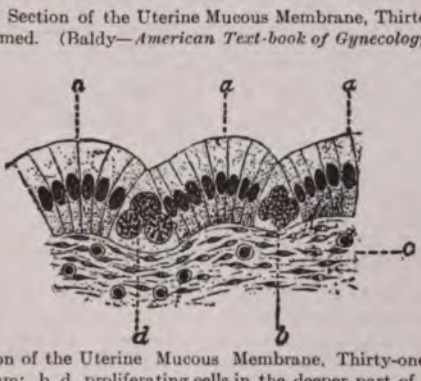


Fig. 590. Vertical Section of the Uterine Mucous Membrane, Thirty-one Days After Curetment: a, a, a, cylindrical epithelium; b. d, proliferating cells in the deeper part of the epithelium; c, newly-formed stroma. (Baldy—*American Text-book of Gynecology.*)

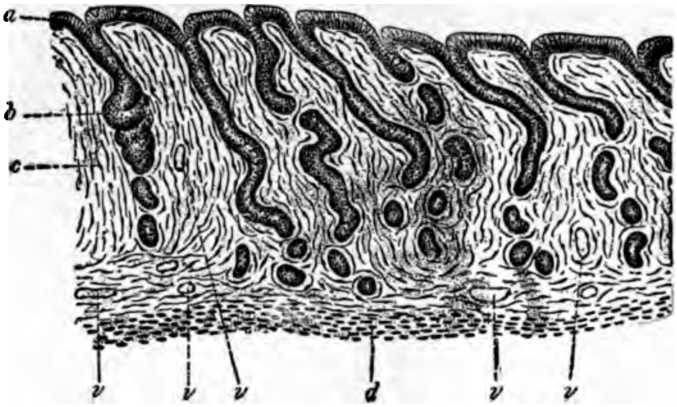


Fig. 591. Vertical Section of Uterine Mucous Membrane, Three Months After Curetment: a, epithelium; b. newly-formed glands; c, stroma tissue; d, muscular tissue of the uterine wall. (Baldy—*American Text-book of Gynecology.*)

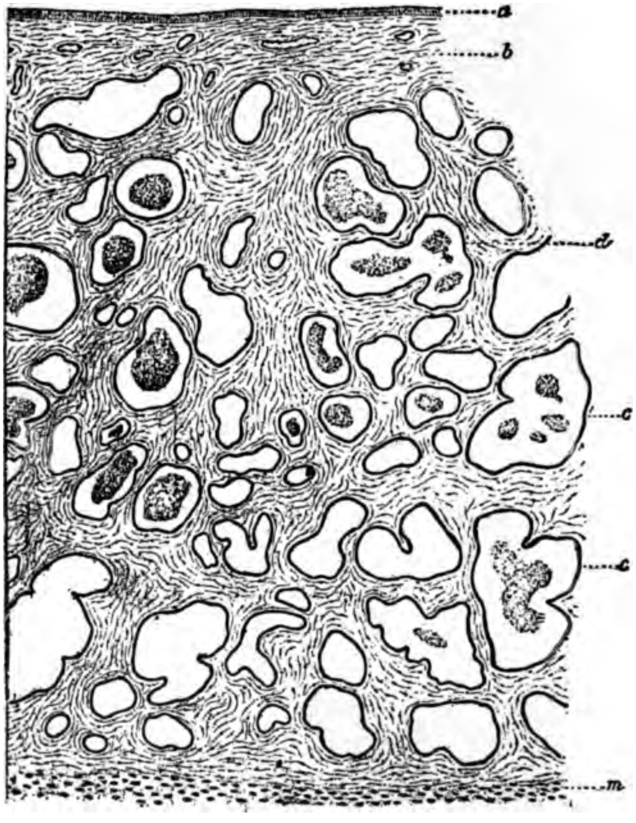


Fig. 592. Vertical Section of the Uterine Mucous Membrane, Fifty-three Days After the Application of a Caustic: a, epithelium; b, connective tissue; c, c, sections of glands which have undergone cystic degeneration; d, tubular glands enormously dilated; m, muscular tissue of the uterine wall. (Baldy—*American Text-book of Gynecology.*)

glands which are not removed in the curetment.

This rapid growth of a new (and presumably more healthy) endometrium after curetment, contrasts markedly with the results following cauterization of the endometrium with strong cauterants, such as nitric acid or chloride of zinc, which were formerly much employed. Fig. 592 shows the result of such destructive caustic action, and should serve as a sufficient warning against the use of destructive cauterants within the uterus before the menopause.

After-care. The antiseptic care of a patient after curetment is practically the same as after repair of cervix.

The vaginal and uterine packing is removed in about forty-eight hours, and an antiseptic vaginal douche (e. g., 1-5000 bichloride) is given once daily. The vulvar dressing is continued for ten days. The patient may ordinarily get up in three or four days after curetment, except when there is some associated disease that would be benefited by longer rest in bed—for example, in chronic salpingitis associated with chronic endometritis, the patient may be kept in bed ten days to two weeks with decided benefit. Some hold that inflammation in the tubes or other tissues about the uterus is a contra-indication to curetment, but I hold just the opposite, i. e., that chronic pelvic inflammation associated with chronic endometritis is in most cases benefited by the curetment.

Curetment is only one step in the treatment of chronic endometritis. The other measures, previously mentioned, should be carried out as before, until the symptoms subside. Additional intra-uterine applications of astringents, the same as used before curetment, may be necessary in exceptional cases. More benefit may be expected from these after the removal of the bulk of the diseased tissue by curetment than before. It is well, however, not to disturb the endometrium for at least one month after the curetment.

Associated pathological conditions, such as malposition of uterus, laceration of cervix, laceration of pelvic floor and pelvic inflammation, must also be corrected, as far as possible, for if allowed to continue the uterine congestion resulting therefrom will tend to prolong the endometritis and will result in the reformation of a thickened bleeding endometrium.

CHRONIC SIMPLE ENDOMETRITIS.

Simple endometritis is endometritis without infection. It is a nutritive change and is nearly always chronic. It is known also as hyperplasia of the endometrium. In its various forms it is sometimes designated as catarrhal endometritis, hypertrophic endometritis, fungous endometritis, polypoid endometritis, hemorrhagic endometritis, atrophic endometritis, chronic endometritis, pseudo-metritis. Some of these terms are used to express particular forms of chronic simple endometritis and some are used to cover all forms of chronic endometritis, both simple and infected. It is a decided advantage to designate a disease or condition by some name which will, as far as practicable, express the distinctive characteristics of that disease. An investigation will, I think, demonstrate to the reader that the names I have selected out of the mass of names applied to the inflammatory and nutritive disease of the uterus, express clear-cut clinical entities—designated by their distinguishing characteristics and covering the field under consideration without troublesome over-lapping.

Etiology.

The cause of simple endometritis is a disturbance of the nutrition of the endometrium without the intervention of bacteria. This nutritive disturbance is due to a deficiency in the quantity or quality of the blood supplied to the endometrium or to special cell-conditions. The particular conditions that tend to affect the endometrium in one or more of the three ways mentioned are as follows:

1. General diseases or extra-pelvic local diseases that produce marked anemia,

for example, chlorosis, phthisis, nephritis, leukemia, gastro-intestinal affections and all wasting diseases.

2. General diseases or extra-pelvic local diseases that cause metabolic by-products and other abnormal substances that circulate in the blood, for example, lithiasis, diabetes and all chronic septic processes.

3. Extra-pelvic diseases or conditions causing chronic pelvic congestion, for example, heart disease with failing competency, occupations that necessitate long standing or excessive walking or much lifting.

4. Pelvic diseases outside the uterus causing chronic pelvic congestion, for example, chronic pelvic inflammation, pelvic tumors and chronic disease of the rectum or bladder.

5. Malpositions of the uterus that interfere with the circulation of blood in the endometrium—anteflexion, retroflexion, retroversion and prolapse.

6. Tumors of the uterus that interfere with the blood-circulation of the endometrium—fibromyomata, carcinomata and sarcomata.

7. Foreign bodies in the uterine cavity, that keep up chronic congestion and irritation of the endometrium, for example, placental remnants left after an abortion, or uterine secretions retained by stenosis.

8. Acute simple endometritis, with the persistence of some source of intra-uterine irritation.

9. When the uterine wall is physiologically hypertrophied and fails to return to its normal condition—subinvolution.

10. Retrograde cell-changes as seen during and following the menopause, or abnormal cell-changes as in a poorly-developed uterus. Cases of uterine inflammation after the climacteric originate in this may, and later, on account of the discharge, infection may take place and acute infected endometritis appear.

Pathology.

There is chronic congestion of the endometrium and of the adjacent muscular tissue, engorgment, serous and cellular infiltration into the tissues, and hyperplasia of the tissue elements in varying proportion. This is the usual change. In some cases, however, there is atrophy and shrinking of the endometrium, instead of increase in thickness. Either form, after continuing many years, tends to cirrhosis of the uterus, though not so markedly as infected endometritis. As indicated under etiology, simple endometritis is nearly always symptomatic of some other affection. It is associated with and dependent upon some other disease, and yet in the course of time that causative disease, for example retroflexion, may be so far surpassed by the symptoms of endometritis as to be of secondary importance.

In the hypertrophic form, the glands increase in number and length and there may be hyperplasia of the stroma cells. The endometrium becomes much thickened and in spots the surface is uneven and nodular (fungous endometritis). Small areas of this cushion of hypertrophied tissue project from the general surface into the cavity. One of these projections may increase until it becomes pedunculated, thus forming a polypus. There may be many of these polypi, forming polypoid endometritis (Fig. 569, 570). This presents the same hemorrhagic tendency as the infected hypertrophic endometritis. There is increased secretion from the glands, causing discharge. The gland-ducts become obstructed, causing cysts. When the endometritis follows abortion or labor, islands of decidual tissue may persist for a long time and act as a source of irritation.

In the atrophic form, the change presented is that of atrophy of the essential tissue-elements, leaving the connective tissue to largely occupy the field. The number of glands is diminished by pressure atrophy, the ducts of some of them becoming obstructed to such an extent that cysts form. The cytogenic tissue also is diminished, and the endometrium becomes unable to perform its function of menstruation or of nourishment of the fertilized ovum. Of course, in either form, infection may take place, and then the symptoms of infected endometritis are added to those of simple endometritis.

Symptoms and Diagnosis.

The symptoms of chronic simple endometritis are about the same as of chronic infected endometritis, namely, vaginal discharge, menstrual disturbances, hemorrhagic tendency, backache, dragging weight in pelvis, tired feeling, sterility, reflex disturbances, enlargement of uterus and increased sensitiveness. The number and extent of the symptoms will depend, of course, upon the extent of the pathological process and the reaction of the patient's nervous system. Chronic simple endometritis differs from chronic infected endometritis in the following particulars:

a. There is no history of infection, i. e., of acute endometritis, either septic or gonorrhoeal. This simple endometritis is the form of endometritis found in girls and unmarried women with menstrual disturbances and in married women who have never had any infection. It is freqeuntly found in the uninfected uterus which is the seat of subinvolution or fibroids or malignant disease or post climacteric inflammation.

b. The discharge is usually not so profuse nor so irritating and, when taken from the uterus, it contains no pathogenic bacteria.

c. There is no evidence about the urethra or vulvo-vaginal glands of previous infection.

d. Tubal complications are very rare.

e. There is nearly always some associated disease, of which the simple endometritis is symptomatic and which must be cured before the endometritis will subside.

Treatment.

The treatment of chronic simple endometritis is about the same as of chronic infected endometritis. The following points should be kept in mind:

1. The general condition, especially the quality and quantity of the blood supplied to the endometrium, is of more importance and consequently the general treatment must be carefully considered.

2. The endometritis is dependent, usually, upon some other disease which must be corrected before the endometritis can be cured.

3. When it is found in virgins, or suspected from the symptoms, attempt amelioration by general treatment (blood, bowels, kidneys, muscular system, skin, gastro-intestinal tract) and avoid local examination or treatment, except in those cases where the urgency of the symptoms or the persistence of the affection makes local treatment necessary. General measures in the virgin are to be tried first. If they fail, then local measures such as vaginal douches may be added. If they fail, then the question of intra-uterine treatment is to be considered.

4. In virgins, intra-uterine applications are not, as a rule, advisable. The vaginal orifice is small, the cervical canal is small and the applications are painful and unsatisfactory. Beside that, the nervous shock incident to the necessary exposure is much greater in the virgin. For these reasons and the additional one that in those cases in which intra-uterine treatment is required applications alone usually fail, my rule is to begin the local treatment in virgins by giving an anesthetic and clearing out the diseased endometrium with the curet, that a new and healthy endometrium may develop under better conditions. Frequently all local applications will thus be avoided. If further intra-uterine treatment is required, applications may be made afterward more staisfactorily and with less pain to the patient.

If applications are needed, the ones mentioned on page 351 may be used. In the hemorrhagic form, copper sulphate solution (10%), tincture of iodine and iodophenol are applicable. In the atrophic form (the most stubborn and painful variety), ichthyol 10% to 50% in glycerine has produced beneficial results. Pure ichthyol is sometimes used. It is well in the atrophic form to combine the applications with drainage by antiseptic gauze.

In patients who object to curetment or in the cases in which the endometritis is so mild or of such short duration that it will probably yield to applications, the following course of treatment may be employed: A few days after menstruation, under proper antiseptic precautions, introduce a narrow strip of iodoform gauze into the uterus. If necessary, dilate the cervix slightly. Then pack the upper part of the vagina lightly with gauze. At the end of two days remove the gauze and cleanse the parts carefully. Then make an intra-uterine application and introduce another narrow strip of gauze into the uterus and another light gauze packing into the upper vagina. At the end of two days the same process is repeated. This may be kept up until two or three days before the next menstrual flow is expected.

In cases where the uterine discharge is free, it is desirable to have the gauze all in one strip with the end near the vulva, and direct the patient to remove the gauze the next day after it is introduced and then take a hot antiseptic douche every 6 to 12 hours until the next intra-uterine application, which is made every two or three days. During the course of treatment the patient should lie down a large portion of the time and should do but little walking and no work. If decided improvement follows this course of treatment it may, if necessary, be carried out in one or two succeeding intermenstrual periods. If there is no decided improvement from the first course of two or three weeks, it is a waste of time to try it longer. Curetment is then necessary. During curetment, if the uterus is in backward displacement it should be brought forward into normal position, if practicable. In anteflexion, which in virgins is very frequently associated with simple endometritis, the dilatation incident to curetment and the subsequent intra-uterine gauze-packing, tends to some extent to overcome the flexion and the resulting stenosis.

The removal of the causative disease in every case is very important, for unless it is removed there is strong probability of recurrence.

5. The prognosis is better, provided the causative disease can be removed, for there are no bacteria to keep up chronic irritation and congestion in the uterus.

SUBINVOLUTION OF UTERUS.

Subinvolution is the term applied to that condition of the uterus found in cases in which, after labor or abortion, it fails to return to its normal size. It remains large and heavy, and its walls have not the usual tone and firmness.

Etiology.

Subinvolution is due to some interference with the retrograde changes that normally follow labor. These retrograde changes that normally take place, consist of atrophy of the muscular and connective tissue. Fatty degeneration, which was formerly supposed to occupy such a prominent place in the process, has been found to be a subordinate feature. The retrograde changes may be interfered with by anything that prevents proper contraction and retraction of the uterus or that causes chronic congestion.

A uterus which becomes infected after labor does not return to its normal size unless the infection is overcome.

Retained membranes or placental remnants also interfere with the process of involution, even without infection.

General diseases producing an impoverished condition of the blood may, following labor, so interfere with the nutrition of the uterus as to cause subinvolution.

Retrodisplacement of the uterus after labor or abortion, is another cause of subinvolution.

Pathology.

The uterus is much thickened, both the muscular wall and the mucous lining being involved. Usually both the body and the cervix are affected, though either may be affected alone. The muscular fibers remain enlarged and show some fatty degeneration. There is a glandular hypertrophy in the mucous membrane and the lymph-spaces remain enlarged. The enlarged uterus often tends to sink low in the pelvis and to fall into retrodisplacement. When subinvolution has been present for a long time, more or less connective-tissue hyperplasia takes place and the change becomes, to some extent, a permanent one. There is usually emplanted on the condition, a simple endometritis of the hypertrophic variety.

Symptoms and Diagnosis.

The symptoms of subinvolution are simply a sense of weight and pressure and weakness in the pelvis, with menstrual disturbances (usually increased flow). As a rule the most prominent symptoms are those due to complications, such as simple endometritis, infected endometritis or retrodisplacement.

In practically all cases of infection following labor or abortion, there is subinvolution, but as the endometritis is the more important lesion, these cases are classed as endometritis The term subinvolution is left for those cases in which the enlargement and softening of the uterus is the principal lesion.

The enlarged uterus is found low in the pelvis and not particularly tender, unless there is a complicating endometritis. The uterus may be retroverted and there is often laceration of the pelvic floor. The history connects the trouble with a previous labor or miscarriage.

Treatment.

The principal disturbances accompanying subinvolution come from the associated diseases, consequently the treatment is directed largely to the associated conditions. The following measures tend to tone up and improve the condition of the uterine wall and tend also to benefit the accompanying endometritis.

1. Give general tonics as indicated by the patient's general condition, and uterine astringents (ergotin, hydrastis, stypticin) to tone up the uterine wall.
2. Give laxatives as indicated by the condition of the intestinal tract.
3. Give hot vaginal douches (antiseptic and astringent), for example, the bichloride douche or the alum and zinc sulphate douche (see Formulæ).
4. Make intra-uterine applications, if indicated by the existing endometritis. Also, employs scarification or ichthyol-glycerine tampons or vaginal suppositories when indicated.
5. Electricity is sometimes of benefit—vagino-abdominal and utero-abdominal applications of either the galvanic current or faradic current.
6. Curetment is the most effective measure for checking the endometritis and reducing the size of the uterus. Curetment should be followed by the other remedial measures, such as hot douches, laxative, uterine astringents internally and, if necessary, intra-uterine applications.
7. Repair of cervix and restoration of pelvic floor may be indicated. Where the cervix has been severely torn or there is severe laceration of the pelvic floor, these lesions must of course be repaired.
8. Excision of cervix. If the cervix is much elongated, the regular wedge-shaped amputation may be carried out (Figs. 564, 566). If the cervix is not large enough to necessitate that and yet is enlarged and heavy, partial excision (Fig. 561) may be carried out.

Prophylaxis of Subinvolution.

Subinvolution is one of those diseases which may in a measure be anticipated and often prevented. The measures to be employed in the puerperium to avoid subinvolution are as follows:

1. Prevent infection following labor or abortion by careful attention to asepsis.
2. See that the uterus is emptied of placental remnants and membranes.
3. Repair all lacerations of the pelvic floor.
4. Keep the uterus well contracted. If it shows a tendency to remain relaxed during the puerperum, give strychnine or ergotin or both. Hydrastis tends to

tone up the uterus and keep it contracted. Also keep the bowels open well, to relieve pelvic congestion, and maintain the patient in good general condition by attention to the general health.

5. Prevent retroversion by keeping the patient on the side after the first day or two, and not much on the back. Before discharging the patient, make an examination and determine certainly that there is no displacement.

6. If there is a generally relaxed condition of the tissues (uterus, vaginal walls, etc.), give a hot vaginal douche (bichloride 1-5000) twice daily after the first week or ten days. If the tissues still remain relaxed, then change to the astringent douche of alum and zinc sulphate (see Formulæ).

HYPERINVOLUTION OF UTERUS.

Hyperinvolution is a very rare condition in which the process of involution following labor does not stop at the normal limit, but continues until the uterus is much reduced in size. The uterus sometimes becomes so small as to measure only an inch in depth. The cause of this trouble is not known. The principal symptom is painful and scanty menstruation. The treatment is not satisfactory. The same treatment is employed as for the dysmenorrhoea and scanty menstruation of simple atrophic endometritis.

In the early part of this year I had a most interesting case of hyperinvolution of the uterus and adnexa. The patient was thirty years of age. Three years previously she had had a severe infection following the birth of her child, and there had been no menstruation since. Pelvic examination showed the uterus to be very small. On account of other trouble it was necessary to open the abdomen, and I had the opportunity of inspecting the internal genital organs. Everything was atrophic—the uterus, ovaries, tubes and round ligaments. The uterus was about half the normal size.

SCLEROSIS OF THE UTERUS.

Sclerosis of the uterus is connective-tissue hyperplasia of the deeper portions of the uterine wall, resulting from irritation and disturbance of nutrition as manifested in the various forms of endometritis. It is the final stage to which all forms of uterine inflammation tend and which they finally reach unless checked. It is eventually the substitution of scar-tissue (new connective tissue) for the parenchymatous tissue-elements (epithelial cells and muscular fibers). It affects the entire thickness of the wall, producing a striking effect both in the mucous membrane and in the muscular tissue. It is known also as chronic interstitial metritis, areolar hyperplasia, cirrhosis of uterus and "irritable uterus." When located principally in the cervix, the seat of laceration and chronic inflammation, it is known as inflammatory hypertrophy.

Etiology.

It is due to persistent chronic inflammation or nutritive disturbance within the uterus.

It is favored by chronic inflammation around the uterus or by pelvic tumors that cause persistent uterine congestion. It is predisposed to by diseases that depress the general health and nutrition, especially by the blood conditions associated with cirrhosis of the kidney and arterio-sclerosis. It is usually due to one of the following chronic affections:

Laceration of cervix, with resulting chronic inflammation.
Ulcer of cervix, with deep inflammation.
Chronic endocervicitis, with cystic degeneration.
Chronic infected endometritis.
Chronic simple endometritis.
Subinvolution.

It may follow destructive cauterization of the endometrium, for example, with zinc chloride or with steam.

Pathology.

The essential changes are hyperplasia of the connective tissue and loss of the parenchymatous elements (epithelial cells and muscle fibers). Following the inflammatory affections, the connective tissue hyperplasia is more active, crowding the special cells and causing them to atrophy and finally disappear. Following the purely nutritive disturbances (subinvolution, simple endometritis) the parenchymatous atrophy rather precedes the connective tissue proliferation, the latter being secondary and to some extent reparative. The process of sclerosis effects not only the endometrium but also the myometrium, so that practically the whole wall of the uterus is involved.

When the process follows subinvolution, the uterus remains much enlarged for a long time. At this stage the tissues are rather soft and the whole uterus may feel flabby and atonic. Later, however, the new connective tissue shrinks and the uterus becomes firm and rigid and smaller. If the uterus was much enlarged as from subinvolution, it would hardly be reduced to normal size by this shrinking. But in a uterus only slightly enlarged, as from chronic inflammation, it may be reduced to normal size or even smaller. In certain cases, this hyperplasia may progress to considerable extent in the myometrium before involving the endometrium, for example, following subinvolution. Here the whole muscular wall may show marked sclerosis (connective tissue hyperplasia and muscular atrophy) while the endometrium shows only simple hypertrophic endometritis (hypertrophy of stroma cells and glands). Later the endometrium also undergoes the sclerotic changes.

Symptoms and Diagnosis.

The symptoms and signs of sclerosis or chronic interstitial metritis are those of chronic endometritis, with the following exceptions:

1. In those cases in which the sclerosis has progressed so far that the endometrium is involved, the menstrual flow is scanty instead of profuse, and in some cases it is absent.
2. The discharge is not so profuse as is usually present in endometritis that produces as much distress.

3. The general disturbance and reflex symptoms and local distress are usually more marked and more rebellious to treatment than is endometritis. The fact that there is more general disturbance with this affection may be due partly to the debilitating disease that preceded and led up to the sclerosis.

4. When the process is well marked, the enlarged uterus is firmer in consistency than the normal uterus or than a uterus which is the seat of endometritis only.

5. Usually in sclerosis, the uterus is more sensitive than in chronic endometritis. Bimanual examination and sounding cause more pain.

6. In the cervix the enlargement may be directly seen.

Treatment.

Sclerosis is little amenable to treatment when it is well established, but it may to a large extent be prevented, and consequently preventative treatment is very important. This consists in checking, as far as possible, all chronic inflammatory and nutritive disturbances in the uterus, correcting displacements and restoring the normal condition. No treatment can remove the excess of connective tissue and restore the normal fibers. Treatment, however, may do good in two ways—(1) by removing endometritis and displacement and laceration, and thus removing many of the troublesome associated symptoms, and (2) by checking the further progress of the sclerosis or at least diminishing the rapidity of such progress.

1. Endometritis, displacements, lacerations and other affections present, should be treated as described elsewhere. In sclerosis of the cervix (inflammatory hypertrophy) a considerable portion of the redundant tissue may be removed in denudation for repair, and the chronic irritation which is augmenting the sclerosis is at the same time removed.

When sclerosis takes place without laceration (simply from endocervicitis or a nutritive disturbance) a portion of the cervix may be removed by excision of a wedge of tissue on each side, making a wound resembling a deep bilateral tear. In some cases, both lacerated and non-lacerated, it is advisable to do a regular amputation of the cervix, though such excessive enlargement in sclerosis is rare.

2. Removal of the accompanying disturbance has much to do with checking the spread of the disease.

An additional step in this direction is the building up of the patient's general health in every possible way and the removal of all causes of pelvic congestion.

With a view to causing absorption of the redundant tissue, various alteratives have been administered, particularly mercury and iodine in different forms, but without any decided effect. As local measures, the following may be used: hot douches, glycerine tampons, and ichthyol to cervix and as an intra-uterine application. Skene considered electricity more useful than any other remedy in this affection. It may be tried by the various methods mentioned in chapter III. After the menopause, the symptoms may disappear, though this is by no means certain to occur.

TUBERCULOSIS OF THE UTERUS.

This term is applied to tubercular disease of the uterine mucosa and myometrium. When the tuberculosis affects only the peritoneal coat of the uterus it is classed as peritoneal tuberculosis.

Etiology.

Tuberculosis of the uterus usually comes from tuberculosis of the tubes. Occasionally it is due to infection from without, in which case it may come from tuberculosis of the external genitals.

It may be produced by coitus with a tubercular husband, the tuberculosis in the husband being located in the genito-urinary tract. It is possible for the infection to be carried in this way when the husband has only pulmonary tuberculosis, for tubercular bacilli have been demonstrated in the comparatively healthy testes and semen of phthisical patients. Infection conveyed by coitus may be first manifested in the cervix or in the body of the uterus. It is held by some that such infection may be first found in the Fallopian tubes. Tuberculosis of the uterus sometimes occurs as a part of a general infection, secondary to pulmonary tuberculosis.

Pathology.

Tuberculosis of the corpus uteri is usually associated with tuberculosis of the Fallopian tubes. Like other forms of genital tuberculosis, it occurs almost exclusively in patients with pulmonary or intestinal tuberculosis.

It affects principally the endometrium and usually does not extend to the muscular portion of the wall until late. It may appear as (a) miliary tuberculosis, (b) diffuse ulcerating tuberculosis (caseous form) or (c) fibroid tuberculosis—each form presenting practically the same distinguishing characteristics here as elsewhere.

Tuberculosis of the cervix is very rare and is usually associated with tuberculosis of the vagina. It appears in the form of a chronic ulcer, which resists treatment.

Symptoms and Diagnosis.

The symptoms of tuberculosis of the endometrium are principally those of a severe chronic infected endometritis. There is nothing particularly distinctive in the clinical evidences of tubercular endometritis. A severe endometritis occurring in a virgin should arouse suspicion of tuberculosis. A persistent and severe chronic endometritis in the presence of peritoneal or tubal tuberculosis or occurring in a patient with phthisis, is possibly tubercular. The diagnosis is made by finding tubercle bacilli in the pus or finding characteristic changes in the scrapings from the uterus.

Treatment.

In all cases, give general anti-tubercular treatment. Tuberculosis of the lower part of the cervix alone, calls for amputation of the cervix or hysterectomy.

Tuberculosis of the body of the uterus indicates hysterectomy (usually vaginal), provided there is no other involvement, e. g., advanced phthisis or very extensive peritoneal involvement. A moderate involvement of tubes and pelvic peritoneum is not a contra-indication to operation, provided the patient is in a fair general condition. In cases in which the patient is not in fit condition for radical operation, or refuses the same, the case is treated on the same general principles as chronic infected endometritis, that is, by curetment followed, if necessary, by antiseptic and astringent applications. Iodoform should be used freely, in powder or emulsion or as soluble bougies. While a cure may, in some cases, follow this mild treatment, its attainment is very uncertain, and owing to the impossibility of determining the limit of the uterine infiltration and owing also to the fact that the infiltration is very likely to spread in spite of all treatment, hysterectomy is the safer plan and the one to be advised.

SYPHILIS OF THE UTERUS.

Primary syphilis (chancre) and secondary syphilis (mucous patches) may be found on the cervix uteri. In secondary syphilis there is probably in the endometrium the same hyperemia and tendency to exfoliation that is so common in other mucous membranes. But this is usually overshadowed by the other manifestations of the disease. The intra-uterine condition may causes the symptoms of mild acute or chronic endometritis. There may be menstrual disturbances and some pain and discharge. If there is recent pregnancy, abortion may result.

It is, however, in the later secondary and in the tertiary stage that the marked changes in the uterus become apparent. The exact pathological changes have not been entirely worked out, but they are supposed to consist in syphilitic infiltration (small gummata and diffuse cellular infiltration) of the endometrium and probably, to some extent, of the myometrium—producing a symptom-complex somewhat resembling chronic simple endometritis of the hypertrophic type.

The most striking clinical manifestation is repeated abortion. The frequent abortions in syphilis are, of course, dependent to a large extent on disease of the spermatozoa or of the ovum and on maternal blood deterioration, but some of them are no doubt due to, and many more are partially due to, the diseased condition of the endometrium.

The diagnosis is made from the history of syphilis, from the effect of treatment and from microscopic examination of tissues from the interior of the uterus.

The treatment is the same as for chronic endometritis, with the addition of thorough constitutional treatment for syphilis.

ECHINOCOCCUS DISEASE OF UTERUS.

This disease affecting the uterus is a curiosity, and yet it is not so rare that it can be ignored in diagnosis. Undoubted cases have been reported in early life and in middle life and later. The liver is the organ usually affected in echinococcus disease. Many other organs, however, have been affected, with or without coincident affection of the liver, and among the organs occasionally affected is the uterus.

When echinococcus disease attacks the uterus, there is nothing especially characteristic. The disease, at first, may resemble chronic endometritis with hemorrhagic tendency. As the cysts becomes larger, a tumor or several tumors become palpable, and the case may be considered one of uterine fibroids. When the masses become still larger, fluctuation may be detected or rupture into the uterine cavity may take place with the discharge of clear fluid and hooklets, and daughter cysts. If rupture takes place into the peritoneal cavity, fatal peritonitis is probable. The process may stop at any stage and the lesion undergo partial absorption. Suppuration may take place in the lesion, forming abscesses. In some cases the symptoms resemble pregnancy, as mentioned by Reed, as follows:

"In cases of echinococcus infection of the uterine cavity, the symptoms may be essentially those of pregnancy. The uterus becomes enlarged and softened, the cervix presenting a bluish aspect. The womb enlarges, progressively and symmetrically, the breasts enlarge and may contain milk, while there is not infrequently reflex disturbances of the stomach. It is the occurrence of these symptoms which has generally caused infections of the uterine cavity by echinococcus to be looked upon as pregnancy, and the resulting cysts to be designated as degenerated ova. In practically all these cases, however, the usual amenorrhoea of pregnancy is absent, while the patient complains of more or less constant dribbling of blood from the uterus. While this is true, the fact must be recognized that infection of the uterine cavity may coexist with pregnancy, as was true in MacNeven's case, in which a large echinococcus cyst was expelled intact, during a true labor and immediately preceding the rupture of the amniotic sac. The exact diagnosis can not be made without the demonstration of the hooklets."

Echinococcus disease of the uterus must not be confounded with the more common "hydatid mole," in which small cysts of varying size are found, and may be expelled in a large mass. The two affections are entirely distinct. The first (echinococcus disease) is due only to the echinococcus parasite in the uterus, while the second (hydatid mole) is due to degenerative changes in fetal membranes—the chorionic villi proliferating and becoming distended with fluid so as to form a mass of little cysts. This affection (hydatid mole) is rather frequent and is described in obstetric works. Occasionally the degenerating chorionic villi take on malignant characteristics and give rise to that form of uterine tumor known as chorio-epithelioma.

The differential diagnosis between echinococcus disease and hydatid mole is made by microscopic examination of the pathological structures—hooklets being found in the first and chorionic villi in the second.

The treatment of echinococcus disease of the uterus consists in the rupture and continual drainage of all cyst cavities, combined with the use of the antiseptics and astringents recommended for endometritis. If the disease persists and is not associated with some contra-indicating lesion, hysterectomy is indicated.

CHAPTER VII.

DISPLACEMENTS OF THE UTERUS

POINTS IN ANATOMY.

The uterus is situated at about the center of the pelvic cavity (Figs. 593, 594) with the body of the organ inclined forward, the long axis of the organ being directed to a point above the symphysis pubis, the direction varying in different individuals and in the same individual at different times. The uterus is not fixed in one position, but can be moved easily in all directions—upward, downward, forward, or laterally. It is pressed somewhat backward in the pelvis when the bladder is distended (Fig. 344) and somewhat forward when the upper part of the rectum is distended.

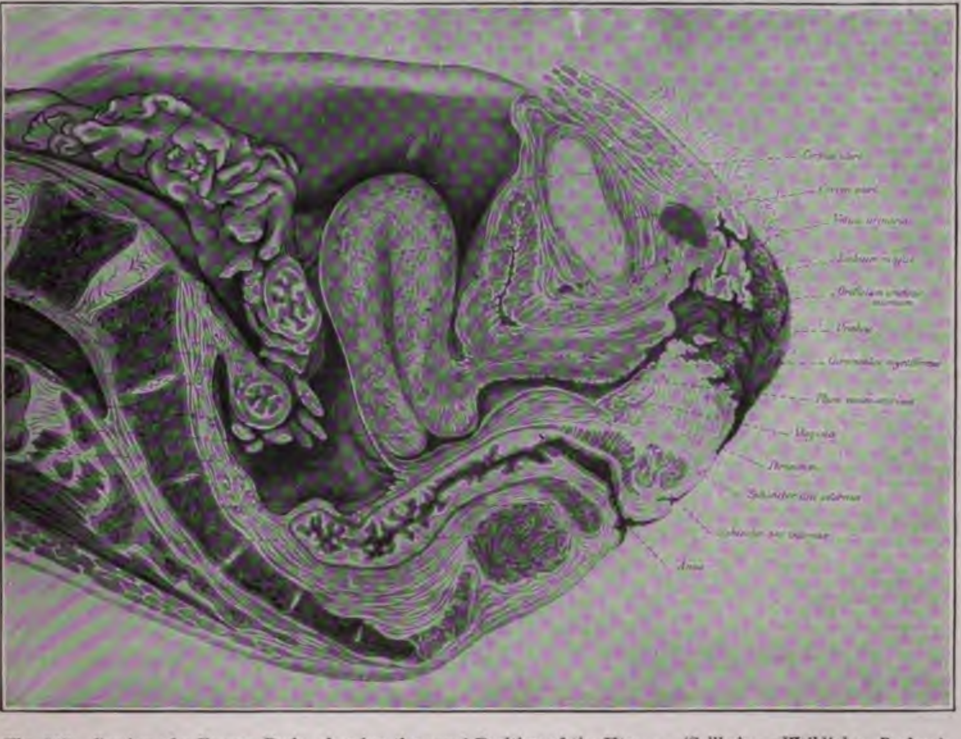


Fig. 593. Section of a Frozen Body, showing the usual Position of the Uterus. (Sellheim—*Weiblichen Becken.*)

It is seen, therefore, that the uterus possesses normally a considerable range of mobility, and it is only when it is found beyond the normal range that it can be said to be displaced.

What holds the uterus in normal position? As just stated, there is nothing that holds the uterus immovably in any one position. By a combination of several factors it is prevented, ordinarily, from going beyond certain limits, and is permitted free mobility within those limits.

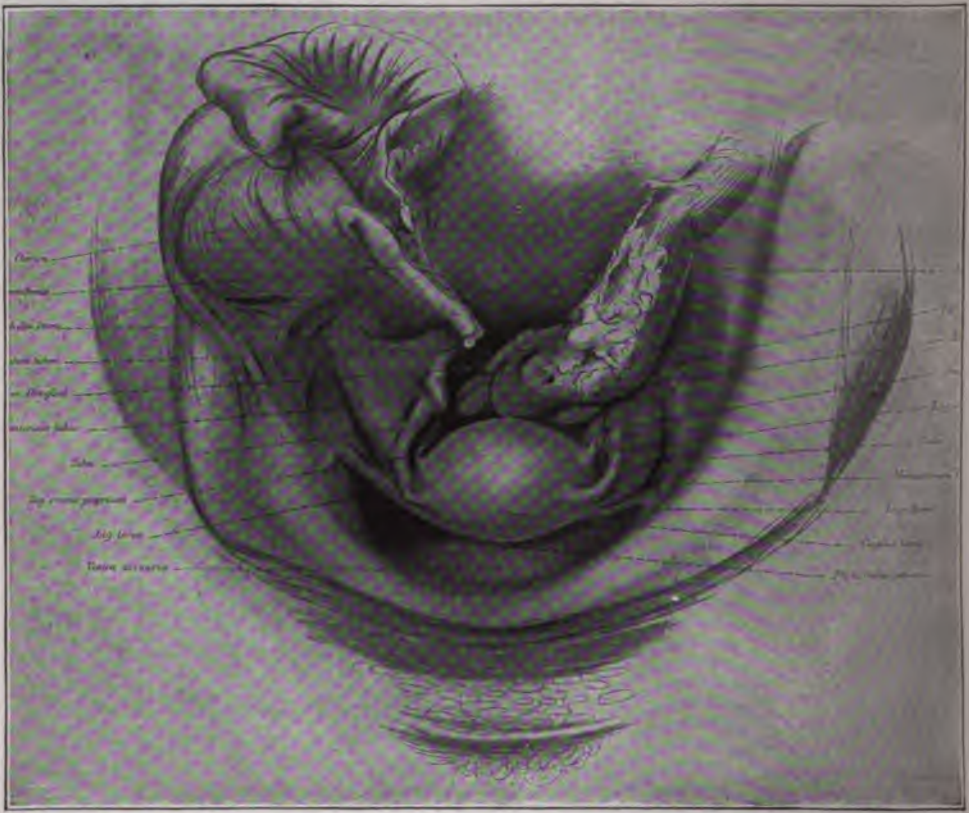


Fig. 594. A View from in front, showing the usual Position of the Uterus. This is the same frozen body shown in Fig. 593. (Sellheim—*Weiblichen Becken.*)

The factors that thus assist in maintaining the uterus within normal limits, or rather assist in preventing its remaining permanently beyond the normal limits, are the following:

The Pelvic Floor (see chapter v).
The Sacro-uterine Ligaments (see chapter vi).
The Broad Ligaments (see chapter vi).
The Round Ligaments (see chapter vi).
The Normal Weight and Size of the Uterus.
The Normal Tone and Fulness of the Pelvic Tissues.

A large heavy uterus tends to downward displacement and backward displacement more than one of normal size. After the menopause the atrophy of muscular tissue and absorption of fat may so interfere with the normal tone and fullness of the tissues as to be a factor in prolapse of the uterus. The previous laceration of the pelvic floor in these cases was not sufficient in itself to cause the prolapse.

BACKWARD DISPLACEMENT OF THE UTERUS.

Backward displacement of the uterus occurs in two forms—retroversion and retroflexion. In **retroversion,** the uterus as a whole is *turned* backward, the relation between the cervix and the body remaining the same. In **retroflexion,** the upper part of the uterus is *bent* backward, the point of bending being about at the internal os. The cervix may retain its normal position in the pelvis but its relation to the fundus uteri is, of course, much changed.

In nearly all cases of backward displacement of the uterus, there is both a retroversion and a retroflexion. The causes of these two displacements are about the same, the symptoms are much the same, the treatment is practically the same and, as the two conditions are nearly always associated, they should be considered together. "Retrodisplacement" is the term I shall generally use in referring to a backward displacement of the uterus. It includes retroversion and retroflexion and the combination of the two.

ETIOLOGY.

A consideration of the factors concerned in maintaining the uterus within the limits of normal position, will indicate in a measure the causes of displacement. It is seldom, however, that one factor alone is affected, but usually several. There are various ways of classifying the causes of retrodisplacement of the uterus. The following classification I find satisfactory and convenient in actual work:

A. Causes connected with labor or miscarriage.

1. **Injury** of the **pelvic floor** and accompanying relaxation of other supporting structures.
    a. PELVIC FLOOR—laceration unrepaired, overstretching or subsequent subinvolution.
    b. SACRO-UTERINE LIGAMENTS—overstretching or subinvolution.
    c. BROAD LIGAMENTS, round ligaments and other pelvic tissues—overstretching or subinvolution.
    d. VAGINAL WALL—overstretching or subinvolution, producing subsequent dragging on cervix.
2. **Subinvolution of uterus** following labor or miscarriage—
    a. OF CORPUS, due to infection or to placental remnants or blood-clots retained, or to an atonic condition of uterus from other cause (anemia, poor pelvic circulation).
    b. OF CERVIX, due to laceration with infection of cervical tissue, or to persistent relaxation or atonic condition from other cause.
3. **Scars** in upper part of vagina, drawing cervix forward.
4. Getting **up too soon** after labor or at work too soon (displacement is favored by the heavy uterus and the relaxed vaginal wall and pelvic floor).
5. Constant **dorsal position** after labor or miscarriage.

B. Non-puerperal changes in uterus.

1. In the **cervix uteri.**
    - a. Inflammatory hypertrophy.
    - b. Idiopathic hypertrophy.
    - c. Tumors.
    - d. Undue dragging down, in examinations and operations.
2. In the **corpus uteri.**
    - a. Inflammation—increasing the weight of the uterus so that it drags on its supports. Also, in some cases, by causing softening and lack of tone in the walls so that the organ bends backward more easily on occasion, and does not possess the tonic elasticity to return to its former shape.
    - b. Tumors in the anterior wall or the posterior wall or in the interior of the uterus. And also projecting polypi.
    - c. Senile atrophy.
    - d. Displacement and failure to replace, in examination or operation.

C. Non-puerperal changes in the supporting structures.

1. Relaxation and stretching from certain kinds of **work.**
2. Relaxation and stretching from **faulty dress.**
3. Relaxation and stretching from **full bladder** (pushing fundus back) or **full rectum** (pushing cervix forward).
4. Stretching by conditions that increase the **intra-abdominal pressure** (persistent cough, straining efforts from stricture of rectum or from chronic bladder disease, etc.).
5. Relaxation from general **atonic conditions** (anemia, etc.). This is often accompanied by general poor support of the abdominal organs (splanchnotosis or enteroptosis), due to repeated pregnancies with poor recuperation afterward or to other cause.
6. Stretching in examinations and **operations.**
7. **Absorption** of muscle and fat in pelvis, due to wasting disease or to senility. This is one of the important factors in prolapse and retrodisplacements that come on after the menopause.

D. Pelvic Tumors.

1. **Ovarian** and broad ligament tumors.
2. **Other tumors** arising in the pelvis or extending into the pelvis.

E. Pelvic Inflammation.

1. **Cellulitis** in front of uterus with the formation of contracting tissue, drawing cervix forward.
2. **Peritonitis,** principally peri-salpingitis and peri-oophoritis forming adhesions with the intestines and the pelvic wall, which adhesions contract later and tend to drag the fundus uteri backward.

3. Chronic **oophoritis** (follicular), increasing the weight of the ovary, and prolapse of ovary, tending to drag the uterus backward. Also chronic **salpingitis** may cause thickening of the tubes and prolapse backward and dragging on fundus uteri.

F. Developmental Defects (congenital causes).

1. **Short vagina,** holding cervix too far forward.
2. **Long cervix** held forward by the pelvic floor, so that the body of uterus must be either in backward displacement or be sharply flexed forward on the cervix.
3. **Imperfect descent of ovary,** causing the upper posterior part of the broad ligament to draw backward.

G. Falls.

PATHOLOGY.

The essential pathological change is indicated in the name and in the definition. The amount of backward displacement may be very conveniently expressed as first or second or third degree. In retrodisplacement of the **first degree,** the fundus lies just about at the promontory of the sacrum, in the **second degree** the fundus lies in the hollow of the sacrum, while in the **third degree** it lies well down in the cul-de-sac below the level of the internal os (Fig. 343). Of course in practice all gradations are found, from the normal position to the most marked backward displacement. The exact dividing line between the different degrees is not distinct and the division into first and second and third degrees is an artificial one but very convenient, and usually cases on examination may be easily placed in one class or the other and so recorded.

The association of version and flexion is almost constant, a pure retroversion or a pure retroflexion being rare. The most common lesion is that shown in Fig. 71—the uterus is **turned** backward far enough for the cervix to point forward and then it is **flexed** still further. The cervix is found pointing more or less towards the vaginal orifice, the body of the uterus is absent in front and is found posteriorly, at the promontory or in the hollow of the sacrum or low in the cul-de-sac, as in Fig. 71.

The broad ligaments are twisted more or less and the return circulation through them is impeded. This causes chronic congestion of the uterus, engorgement, cellular infiltration, simple endometritis and hypertrophy.

If the displacement follows labor or abortion, it interferes with the normal process of involution and causes subinvolution. If it is accompanied with infection, it aggravates the resulting inflammation.

If it occurs with laceration of the pelvic floor (and the association is very common) it increases the distress of that condition and tends to cause prolapse, by increase in the weight of the uterus and also by bringing the *point* of the uterine wedge (instead of a broad surface) to press against the weak place in the pelvic floor (Fig. 287).

The fundus as it goes back in the pelvis frequently takes the tube and ovary of one or both sides with it to some extent. The ovaries are the structures the more frequently displaced, and one or both of them may be found in the hollow of the sacrum close to the displaced fundus, or even below it in the cul-de-sac.

In many cases there has been inflammation in the Fallopian tubes, resulting in peritoneal exudate and adhesions. These adhesions fasten the uterus more or less firmly in its abnormal position. They may hold the uterus almost immovable, or they may be so long as to permit the uterus much latitude in movement, but will not permit it to come entirely forward. Again, if the adhesion is to a movable structure, such as an intestinal coil or the sigmoid, the uterus may be brought forward temporarily but is soon drawn back into the abnormal position.

There is a rare condition known as "retrodisplacement with anteflexion," in which an anteflexed uterus, while maintaining its anteflexion, becomes turned backward so that the fundus lies in the posterior part of the pelvis.

SYMPTOMS.

The symptoms accompanying retrodisplacement of the uterus are due principally to the complications. There has been some question as to whether uncomplicated retrodisplacement causes any symptoms. It may be said that retrodisplacement, as met with in actual work, is rarely without symptoms. Occasionally a uterus is found in backward displacement without any symptoms referable directly or indirectly to it. But as a rule, retrodisplacement causes symptoms or aggravates symptoms due to some other disturbance.

The principal symptoms are BACKACHE, a sense of WEIGHT in the pelvis, and MENORRHAGIA. Sometimes only one and sometimes only two of these symptoms are present, but most frequently all of them are complained of.

In the **menorrhagia,** the increase in the menstrual flow is usually moderate only, and more marked in the amount than in the duration. It is not always present. In a certain proportion of the patients, the menstrual flow remains unchanged, and in some it is diminished.

Sometimes in young women, the menorrhagia is the only symptom. This menorrhagia from retrodisplacement may be the cause of delayed menopause. When the menorrhagia is pronounced and long continued, it leads to severe anemia and marked deterioration of the general health.

The **backache** is usually located low over the sacrum and occasionally there is also much pain in the region of the coccyx (coccygodynia). Occasionally the backache extends higher along the spine. It is more commonly found in long-standing retrodisplacement and in the complicated cases—particularly those complicated with pelvic inflammation. Painful menstruation present is not so evidently due to the displacement, as is the menorrhagia.

Leucorrhoea is usually present, but is due to the displacement only secondarily, being caused by the chronic congestion of the endometrium and resulting excessive glandular secretion and endometrial hyperplasia. **Bladder** and **rectal** disturbances are sometimes present, especially when the uterus is large and the fundus is displaced far down in the cul-de-sac, compressing the rectum or pressing the cervix far forward against the bladder.

Sterility is, in some cases, apparently due to retrodisplacement, though not as frequently as to anteflexion of the cervix and the associated conditions. Not infrequently in a married woman who has been long sterile, pregnancy follows correction of the displacement. Occasionally the pregnancy follows so promptly as to leave little doubt that the sterility was occasioned by the displacement itself and not by any associated inflammatory trouble in the cervix or body of the uterus.

Repeated abortion without apparent cause is another condition that should arouse suspicion of uterine retrodisplacement. **Reflex symptoms,** headache of various kinds and stomach disturbance or functional nervous disturbance, are occasionally apparently due to a retrodisplacement, but on the whole the frequency of reflex symptoms is probably exaggerated.

DIAGNOSIS.

The symptoms mentioned are common to many diseases and hence are not at all distinctive of retrodisplacement. The **diagnosis** of retrodisplacement must rest upon the physical examination. In examining the patient it is found usually that the cervix is lower and farther forward than is normal, and that it also points forward.

When making the bimanual examination search is made for the body of the uterus in its normal location, by placing the ends of the fingers in the vagina in the front of the cervix and pushing the cervix upward and backward and at the same time pressing the fingers of the other hand into the pelvis from above. In retrodisplacement it is not there (Fig. 69). Then placing the vaginal fingers back of the cervix and making bimanual examination (Figs. 70, 71), a mass is found back of the cervix, which is about the size and shape of the body of the uterus and apparently continuous with the cervix. This is the body of the uterus in its backward position.

If the uterus is in only the first degree of retrodisplacement (Fig. 343), the fundus may be so high as to be out of reach of the vaginal fingers, and yet far enough back to be out of reach of the fingers above. The difficulty is much increased if the patient holds the abdominal muscles rather tense. In these cases the body of the uterus may sometimes be raised so it can be felt by the abdominal hand by pushing up the cervix with the fingers in the vagina. This lifts the whole uterus—body and all. If the displacement is marked (that is, second or third degree) the fundus can usually be felt by the vaginal fingers, back of the cervix. When a mass is felt in front or behind the cervix, it must then be determined whether or not it is the corpus uteri. The following conditions may cause an error in diagnosis.

A tumor in the anterior wall of the uterus (Fig. 84).

A tumor in the posterior wall of the uterus (Fig. 392).

A mass in the cul-de-sac, due to prolapsed ovary or tube (Fig. 391) or to an inflammatory exudate (Fig. 401) or to a tumor.

The differential diagnosis is made by making out the position, size, shape, consistency, tenderness, mobility and attachments of the mass, as explained under Gynecologic Examination (page 68).

Determine Mobility. After having determined that the body of the uterus is backward, and about how far backward, the next point to determine is whether or not it is freely **movable.** The vaginal fingers are pressed well in under the

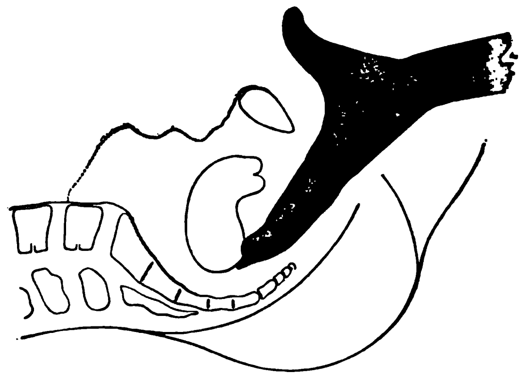


Fig. 595. Attempting to Raise the Fundus Uteri, to determine whether or not it is fixed. This is also the first step in Bimanual Replacement of the uterus. (Pryor—*Gynecology*.)

fundus and an attempt is made to lift it (Fig. 595). If it can not be raised from its position, it is fixed. The fixation may be due to adhesions or to the fundus being caught under the promontory of the sacrum. To determine which condition is present, catch the cervix with the tenaculum-forceps and pull it downward and forward (Fig. 596). This maneuver pulls the uterus forward and away from the promontory. Then, while holding the uterus in that position, the fundus may be lifted past the promontory (Fig. 597), provided it is not otherwise held. If still the uterus can not be raised, it is probably **adherent**—i. e., fixed in its false position by adhesions, the result of inflammation. This probability is increased if there is evidence of inflammation about the tube on either side.

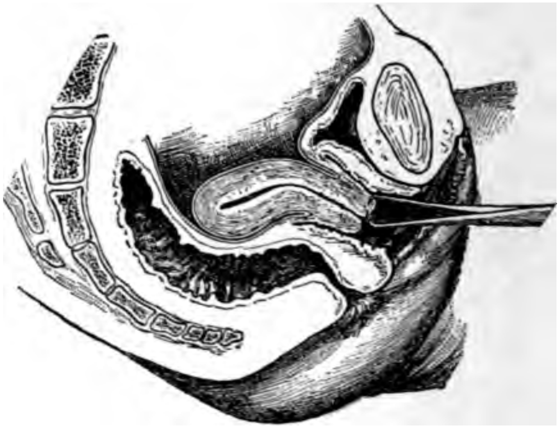


Fig. 596. Bimanual Replacement. Catching the Cervix and Pulling Forward the Uterus, so the fundus will be clear of the sacral promontory. (Kelly—*Operative Gynecology*.)

There is one other condition that may cause the uterus to be held in its backward position. Sometimes when the fundus lies low in the cul-de-sac, the sacro-uterine ligaments produce some constriction above it and prevent its return. This action of of the sacro-uterine ligaments is increased if the cervix be strongly pulled upon. This is a rare condition and is possible only when the uterus is in the third degree of retrodisplacement.

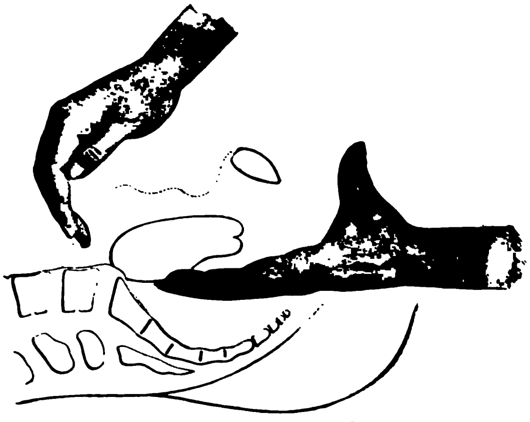


Fig. 597. Bimanual Replacement. Raising the Fundus Uteri past the sacral promontory. (Pryor—*Gynecology*.)

Complications. There are

several conditions that frequently accompany retrodisplacement and that must be taken into consideration.

1. Laceration of pelvic floor.
2. Laceration of cervix.
3. Endometritis.
4. Salpingitis, with or without exudate and adhesions.
5. Tumors, uterine and ovarian.

The last two mentioned may cause trouble in determining the exact location of the body of the uterus. In examining a patient, do not stop when you find one lesion but make a thorough examination and find all the lesions present.

TREATMENT.

If there are no symptoms, no treatment is needed. But the patient should be kept under observation so that if symptoms do develop, effective treatment may at once be instituted before the case has run along and developed complications.

The treatment to be adopted depends on whether the uterus is movable or adherent.

When the Uterus is Movable.

In a case of retrodisplacement with movable uterus,the first step in the treatment is to **replace the uterus** to its proper position. There are two ways of doing this—by bimanual manipulation or by employment of the knee-chest posture.

Bimanual manipulation. By the manipulation employed in the bimanual examination, the uterus is often replaced.

If it cannot be replaced by the ordinary bimanual examination methods, then catch and draw down the cervix with a tenaculum-forceps (Fig. 596), and raise the fundus as high as possible with the fingers in the vagina. Then press the abdominal hand deeply into the back part of the pelvis, locate the promontory and then work along it into the pelvis back of the uterus (Figs. 597, 598). The fundus uteri is then brought forward and at the same time the cervix is carried backward, as shown in Fig. 599. After bringing the fundus forward, bend it well down over the vaginal fingers as shown in Fig. 600, in order to take out any backward flexion that may be present.

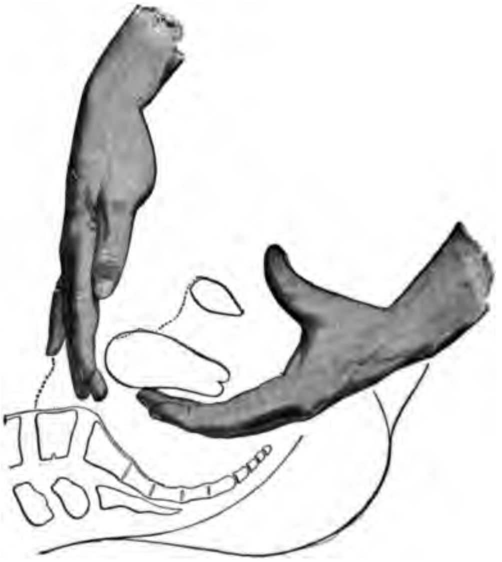


Fig. 598. Bimanual Replacement. Working the Abdominal Fingers down over the sacral promontory, so as to get behind the fundus uteri and bring it forward. (Pryor—*Gynecology*.)

To carry out these manipulations successfully, the abdominal walls must be relaxed and the uterus not very tender. If the patient has a thick layer of adipose tissue, the examining fingers sometimes can not get near enough to the uterine body to manipulate it satisfactorily. If the patient holds the abdominal walls tense, on account of pain or nervousness, the abdominal fingers cannot reach the uterus. If the uterus is inflamed and tender, the pressure necessary to these manipulations causes too much pain.

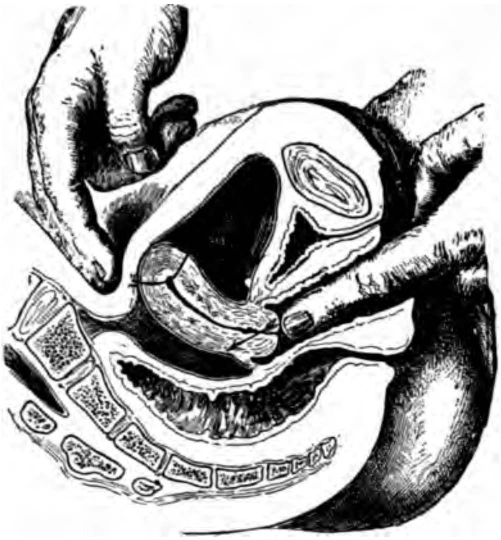


Fig. 599. Bringing the Fundus Uteri forward and pushing the Cervix backward and upward. (Kelly—*Operative Gynecology*.)

Knee-chest posture. When the uterus, though movable, cannot be replaced by the bimanual manipulations, the knee-chest posture may be used (Fig. 469). After the patient has been placed in this position (with the clothing about waist thoroughly loosened) the Sims speculum is introduced (Fig. 470). The cervix is then caught with the tenaculum-forceps and pulled forward. This brings the fundus uteri out from the promontory and permits it to fall forward into its proper position. The cervix is then pushed well backward into the hollow of the sacrum, and a pessary or packing is put in to hold it there.

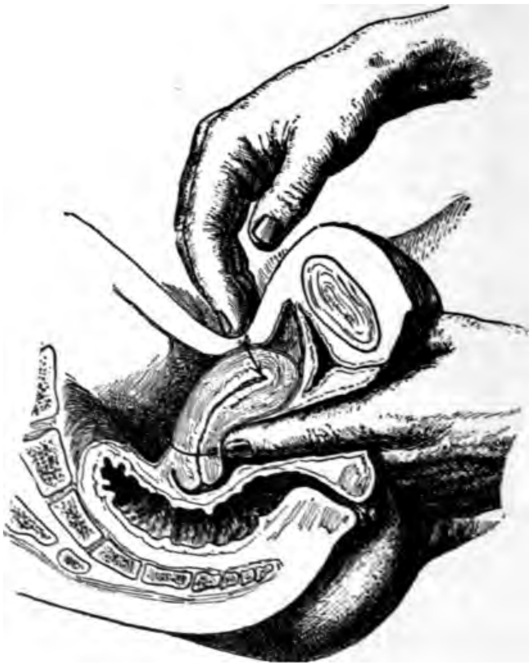


Fig. 600. The Uterus brought forward into position. This shows also the method of taking the backward flexion out of the uterus, by bending it firmly forward over the vaginal fingers. (Kelly—*Operative Gynecology*.)

The method of replacement by sound or repositor I mention only to condemn. The sound or intrauterine repositor used in this way is dangerous. A uterus that is not adherent can usually be brought forward by one of the two methods already mentioned. A uterus that is adherent could not be brought forward by the sound or repositor, and its use in such a case is liable to lead to inflammation or perforation of the uterus.

In some cases the uterus and adjacent tissues are too tender to permit the manipulations necessary for replacement. In such a case, hot vaginal douches, purgatives and the knee-chest posture morning and evening for a few days, may diminish the tenderness very much. In such a case, after the knee-chest posture has been taken morning and evening for a few days, the uterus may be found forward at the next examination.

Vaginal tamponade with the patient in the knee-chest posture or in the Sims posture, with gauze or cotton, every second or third day, helps to restore the uterus to its normal position. Also, in cases where no pessary is at hand, the uterus, after replacement, may be held in place temporarily by packing the vagina with gauze or cotton in such a way that the cervix is held well back in the pelvis. Again, when a pessary has to be removed temporarily for any cause, the method of holding the uterus by packing may be employed. This method does very well for holding the uterus in position for a short time, but the packing must be changed every few days, hence the method is not suitable for long-continued use.

The Pessary. After the uterus has been replaced, then comes the problem of holding it there. The most convenient and efficient device for this purpose is the pessary. In uncomplicated cases this is often all that is needed. The varieties of pessaries, their mode of action, the manner of their introduction and their after-care are given in detail in chapter III (see Pessaries).

The Thomas, the Smith and the Hodge pessaries (Fig. 452) are the ones to be used for retrodisplacement, according to the particular indications given for each.

In some cases the patient is made fairly comfortable by simple support of the uterus without replacement, such as is given by tampons or by the inflated ring pessary (Fig. 460). Patients sometimes secure these inflated-ring pessaries themselves, from friends or from agents or through advertisements, and experience so much relief that they believe themselves cured. And in some cases there is considerable benefit persisting for some time after the support is removed, because the stretched pelvic tissues have gained in tone while the uterus was supported. The relief in these cases comes from the relief of the downward dragging of the uterus as a whole, for there is ordinarily no correction of the retrodisplacement (unless the patient happens to employ the knee-chest posture at the same time). It is far preferable in such a case to use the form of pessary that will hold the uterus in normal position and thus tend to permanent relief.

The effect just noted of the simple support of the uterus, serves to show the importance of the slight PROLAPSE in these cases and serves to show also that the retrodisplacement, as a factor in the causation of the symptoms and as a factor to be considered in the treatment, is not of such exclusive importance as one would infer from the usual teachings on this subject. The relief that follows operative replacement and permanent correction of the retrodisplacement, is due to a large extent to the simultaneous elevation of the uterus and adnexa.

In some cases the pessary may be removed in a few weeks and the uterus will stay in position without further attention. In other cases the pessary must be worn for several months, being removed at intervals, as explained in chapter III.

In a considerable proportion of cases in which the uterus is movable, the pessary is not satisfactory, for one of the following reasons:

Laceration of the pelvic floor.
Prolapsed and tender ovary or tube.
Nervousness.

In the first class of cases, the pessary fails to keep the uterus in position. The weakening of the pelvic floor permits the anterior end of the pessary to sink below its point of support. It sinks down to a wider part of the pubic arch and then slips out of the vaginal opening. The cervix uteri then sinks forward and the fundus goes backward, as explained on page 330.

When an ovary has prolapsed into the posterior cul-de-sac the pessary presses on it and causes pain. The same thing happens if an enlarged and tender tube drops into this situation, or if there is an inflammatory exudate there. In either case, the pessary causes so much pain that it cannot be worn.

There is occasionally a case in which, though the pessary holds the uterus in position and causes no particular pain, it makes the patient uncomfortable and nervous to such an extent that its use is not satisfactory.

In all such cases other measures for holding the uterus in position must be employed.

Operative treatment. When there are troublesome symptoms that are not relieved by the measures previously mentioned, operative treatment is required. The various classes of operative measures are mentioned further along (page 609).

In order that the operative treatment may prove satisfactory, the patient should be put through a most careful and thorough pelvic examination, that the exact cause of the persistence of the displacement may be accurately determined, and the form of operative treatment selected accordingly.

In a large proportion of the patients who have borne children, there will be found a relaxed condition of the pelvic floor and of the broad ligaments and sacro-uterine ligaments. It is evident that in such a case, the simple bringing of the fundus uteri forward and fastening it there is only a small part of the necessary work. The pelvic floor must be strengthened, and some means must be used also to lift up the uterus and thus overcome the prolapse due to the relaxation of all the supports of the organ. In many of these cases the uterus is large and heavy from subinvolution and is the seat of chronic endometritis.

When the Uterus is Adherent.

When the fundus uteri cannot be brought forward by the methods previously described and no tumor that is responsible for the fixation can be felt, it is assumed that the uterus is "adherent," i. e., held in its abnormal position by the products of pelvic inflammation, affecting the tube or the peritoneum or the connective tissue. The fixation may be so close that the fundus cannot be moved appreciably, or it may, on the other hand, permit considerable movement in various directions, but not enough to allow the fundus uteri to be brought entirely forward.

For the purposes of treatment it is convenient to divide these cases of adherent retrodisplacement into two classes—(1) those in which the inflammation is acute or subacute, and (2) those in which it is chronic or has practically disappeared, leaving only the sequelae.

Inflammation Acute. These cases present, in addition to the retrodisplacement of the uterus, the usual symptoms and signs of acute or subacute pelvic inflammation. The symptoms presented by the patient are due principally to the inflammation, and the treatment is at first directed wholly to that. The general and special measures for acute pelvic inflammation (see chapter x) are used and continued for several weeks, until all acute symptoms have disappeared.

No operation or other direct disturbance of the tissues for the purpose of bringing the uterus forward is indicated in this acute stage. All operative measures are to be postponed, except so far as such measures may be indicated directly by the inflammation. The patient is treated for the pelvic inflammation the same as though she had no retrodisplacement.

When the inflammation subsides, the troublesome symptoms may disappear to such an extent that no treatment for the retrodisplacement is required. It is the relief of pain and discomfort that the patient seeks and when this can be secured simply by the relief of the inflammatory trouble, it is not necessary to disturb the uterus. In fact, as a rule, anything in that direction short of removal of the inflammatory focus, will tend to stir up again the troublesome symptoms.

Most of these patients require operative treatment later, but occasionally there is a patient who continues to feel perfectly well after she recovers from the attack of pelvic inflammation—she can work hard, goes as much as she pleases, and she is symptomatically a well woman. It has been my experience that this permanent or long-continued freedom from troublesome symptoms without satisfactory replacement of the uterus, occurs more frequently in the cases of retrodisplacement with a fixed uterus than in those with a movable uterus, though it is not very frequent in either. The fixation prevents the constant downward dragging (beginning prolapse) which produces a large part of the distress in the ordinary cases of large heavy retrodisplaced mobile uteri.

Operation is required however in a majority of these cases sooner or later, either because of a persisting focus of inflammation, with chronic invalidism, or because of the sinking and dragging of the heavy retrodisplaced uterus on the damaged and sensitive adnexa or adjacent structures. In the cases of a partially movable uterus, the wearing of a pessary (for example, the inflated-ring pessary) that holds the heavy uterus up some, will sometimes give considerable relief. Such a pessary prevents the constant dragging of the uterus on its supports and on the sensitive adnexa, and in that way gives relief, though there is no correction of the retrodisplacement.

Inflammation Chronic. In the chronic cases, fixation of the retrodisplaced uterus is usually due to inflammation beginning in a Fallopian tube, consequently it is frequently accompanied by salpingitis and an inflammatory exudate involving one or both tubal regions. There may be a collection of pus in a tube or in the mass of exudate about the tube, or there may be only a mass of inflammatory exudate without pus, or there may be only adhesions. If the previous inflammation was in the connective tissue, there will be infiltration remaining from the pelvic cellulitis (parametritis). In either case, the uterus is found in an abnormal position and cannot be replaced by the methods previously described.

In these cases, considerable relief may be given by measures that tend to allay the accompanying pelvic inflammation and that stretch the adhesions and that support the uterus to some extent. The palliative measures mentioned under chronic pelvic inflammation (see chapter x) may be employed. For support, the inflated-ring pessary is useful (Fig. 460).

For stretching the adhesions and infiltrated tissues, in an endeavor to restore the uterus to its normal position, pelvic massage and pressure treatment are useful (pages 359, 364). Cases with slight adhesions, and especially cases in which the uterus is held in its abnormal position by the sequelae of a pelvic cellulitis only, may be benefited thereby, and in such cases these measures may be given a thorough trial. But in the majority of cases of fixed retrodisplacement, the inflammatory lesions are of such character that this attempted stretching can do no good and may do much harm. The proportion of cases in which permanent relief of the pelvic distress can be secured, in this way, is very small. At least, such has been my observation, as I have studied this class of cases month after month and year after year. And I have endeavored to find for each variety, the treatment that would give the required relief with the least danger to the patient and the least sacrifice of tissue.

In the SEQUELAE OF CELLULITIS, without associated peritoneal involvement, I expect softening and stretching of infiltrated tissue, increased mobility of the uterus, improvement of the intra-pelvic circulation (lymph and blood), relief of distressing symptoms, and in some cases a complete restoration of the uterus to its normal position.

When there is a peritoneal or TUBAL INVOLVEMENT, as evidenced by a history of attacks of pelvic peritonitis and by induration in one or both tubal regions, little can be expected from stretching or kneading of the affected tissues. Even though all acute inflammation has apparently long since disappeared, these tubal and peri-tubal and peri-ovarian lesions are usually aggravated rather than improved by massage or pressure treatment. As previously explained, there is present in nearly all these cases a focus of active irritation in the tubes. Nature may take care of this and, if assisted by rest and general measures, may limit it so that it causes little trouble or may eradicate it entirely, but pelvic massage and pressure treatment are likely to interfere with this natural cure instead of aiding it, except as to hastening the absorption of outlying masses of exudate.

Operative treatment is indicated in practically all cases of fixed retrodisplacement, except in those in which the fixation is due wholly to the sequelae of pelvic cellulitis or scar-tissue about the vaginal vault. I refer, of course, to those cases in which troublesome symptoms persist in spite of treatment for the pelvic inflammation.

The objects of the operative treatment are two, first the removal of products of inflammation and of damaged organs as far as necessary and, second, the lifting and bringing forward of the body of the uterus and fastening it.

These objects may be accomplished by either vaginal section or abdominal section. There are certain cases in which vaginal section is the preferable method of approach and there are other cases in which abdominal section is clearly indicated. Between these special cases at each extreme there is a large middle class of the chronic cases in which the work may be satisfactorily accomplished by either route. Some operators prefer one and some the other route. For myself, I think that in the majority of these cases abdominal section is preferable. It gives a much better chance for an accurate determination of what structures should be removed and what should be left. It gives a better chance also for complete and accurate removal of diseased structures without injury to tissues that are left. Furthermore, it permits the fastening of the uterus well forward in such a way that it and its adnexa are satisfactorily *elevated* as well as brought forward.

The portion of the operative work dealing with the inflammatory trouble will be mentioned under chronic pelvic inflammation (chapter x). The operative measures for the correction of the displacement, after the inflammatory trouble has been taken care of, are mentioned below:

Operative Measures.

The operative measures required in patients with retrodisplacement of the uterus may be divided into three groups—(a) measures for reducing the inflammation and enlargement of the uterus and for restoring the pelvic floor, (b) measures for relieving or removing the pelvic inflammation, and (c) measures for bringing the uterus and adnexa forward and upward and fastening them there. The measures of the first and second classes are given elsewhere, under the respective diseases.

The operative measures for holding the uterus forward are very numerous, the number running well above a hundred. There are, however, certain representative operations that may be mentioned in order to give an idea of the various methods of approach and the various structures utilized. The methods of approach are (A) through the inguinal canals, (B) through a median abdominal incision, and (C) through the vagina.

A. Through the Inguinal Canals.

1. EXTRA-PERITONEAL SHORTENING OF THE ROUND LIGAMENTS (Alexander-Adams Operation). An incision is made over the inguinal canal on each side and the round ligament is isolated and drawn out sufficiently to take up the slack and bring the uterus forward. The ligaments are then fastened in the canals by sutures. The peritoneal cavity is not opened.
    a. Operation is entirely extra-peritoneal.
    b. Utilizes the strong proximal portion of the round ligaments for supporting the uterus.
    c. Does not permit the breaking up of adhesions.
    d. Does not permit direct exploration of the pelvis, to ascertain abnormal conditions or to make certain that the uterus comes satisfactorily forward without complications.
    e. Ligaments pull laterally instead of forward and hence permit return of displacement when there is much backward tendency.
2. INGUINAL COELIOTOMY WITH SHORTENING OF ROUND LIGAMENTS (Goldspon Operation). This is practically the same as the Alexander operation, except that the peritoneal cavity is opened on one or both sides.
    a. Utilizes the strong proximal portion of the ligaments for supporting the uterus.
    b. Permits partial exploration of the pelvic cavity and the breaking of light adhesions.

c. Ligaments pull laterally instead of forward.
d. Has the disadvantage of median abdominal section (peritoneal cavity opened) without the advantages (through exploration, safe removal of diseased structures, forward pull of new ligaments).

B. Through Median Abdominal Section. Pertaining to all the operations in this class are the advantages of thorough exploration of the pelvis and lower abdomen and the safe removal of diseased structures, including the appendix when necessary. The special advantages and disadvantages of each submethod are indicated below.

1. FASTENING THE FUNDUS UTERI DIRECTLY TO THE ABDOMINAL WALL.
    - I. VENTRO-FIXATION. The fundus uteri is scarified and sutured directly (without intervening peritoneum) to the subperitoneal aponeurotic structure of the abdominal wall.
        - a. The uterus is fastened very firmly forward, so that there is hardly a possibility of return of the displacement.
        - b. Causes serious interference with the development of the uterus in pregnancy, hence is not permissible ordinarily in the child-bearing period.
    - II. VENTRO-SUSPENSION. The fundus uteri is fastened by small silk sutures to the peritoneum of the abdominal wall. The idea is to secure the formation of a band of tissue which will hold the fundus forward (suspend it from the wall) but will not interfere with the development of the uterus in pregnancy. (Some prefer to pass the suspension sutures through the utero-ovarian ligaments rather than directly through the uterine tissue).
        - a. Direct forward pull, holding the uterus well forward.
        - b. Does not interfere with the development of uterus in pregnancy.
        - c. Uncertainty of ultimate result. The suspending band may become so stretched that it permits return of the displacement or, on the other hand, an unusual amount of scar-tissue may form causing a firm fixation of the uterus to the abdominal wall, which would seriously interfere with the pregnancy.
        - d. There is a free band in the abdominal cavity, occasionally leading to intestinal obstruction.
2. INTRA-ABDOMINAL SHORTENING OF ROUND LIGAMENTS.
    - I. Folding of the round ligaments in various ways.
        - a. No interference with pregnancy, as the round ligaments enlarge with pregnancy and undergo involution afterward.
        - b. No free band in abdominal cavity.

    - c. The strain comes on the weak part of the ligament near the inguinal ring. This is likely to stretch and permit return of the displacement.
  - II. Drawing the round ligaments through a hole in the broad ligament of each side and fastening them together back of the uterus.
    - a. Secures excellent elevation of the uterus and adnexa.
    - b. The strain falls on the weak portion (distal portion) of the round ligaments.
  - III. Suturing middle of round ligaments to the peritoneum of the anterior abdominal wall.
    - a. Peritoneal adhesions stretch in time and are likely to permit return of the displacement.

3. TRANSPLANTATION OF ROUND LIGAMENTS INTO THE ABDOMINAL WALL. The intra-abdominal portion of each ligament is drawn into the musculo-aponeurotic layer of the abdominal wall and fastened in the median incision (the median incision may be longitudinal or transverse). The shortened ligament leaves the abdominal cavity at different points in the different classes of operations, as follows:
  - I. Out through the aponeurotic wall at the internal inguinal ring, and then to the median incision (Sandberg, Peterson, Montgomery, Barrett and others).
    - a. Utilizes the strong portion (proximal portion) of ligaments for supporting the uterus.
    - b. No free band in peritoneal cavity.
    - c. Direction of pull on uterus is lateral instead of forward, hence the displacement is likely to return if there is much backward tendency.
  - II. Out directly through the rectus muscle (Gilliam Operation).
    - a. Utilizes the strong proximal portion of the ligaments.
    - b. Direction of pull is directly forward, hence holds uterus and adnexa well forward and upward, against even strong backward tendency.
    - c. Can be used even when the round ligaments are fixed by inflammatory infiltration or are too weak to be used for extensive implantation.
    - d. Gives two free bands in the peritoneal cavity, which may cause intestinal obstruction.
  - III. Out directly through the rectus muscle, with the addition of a suture in each side to unite the distal portion of the round ligament to the anterior abdominal wall and thus close the opening through which an intestinal coil might slip (Gilliam-Ferguson Operation).
    - a. Utilizes the strong portion of the ligaments.
    - b. Direction of pull is directly forward.

    - c. Can be used even with fixation of the round ligaments or serious attenuation of the same.
    - d. No free band in peritoneal cavity.
    - e. Operative manipulations more complicated and time-consuming than necessary, where the round ligaments are in good condition.
  - iv. Out through the peritoneum near the internal inguinal ring, then along in the subperitoneal tissue and out through the rectus muscle (Gilliam-Crossen Operation). The details of this are explained later (Figs. 601, 602, 603).
    - a. Utilizes the strong portion of the ligaments.
    - b. Direction of pull is forward. It is not so directly forward as in the regular Gilliam operation, but sufficiently so to answer the purpose in practically all cases.
    - c. No free band in peritoneal cavity.
    - d. Operative manipulations are few and quickly executed.
    - e. Not applicable in cases of fixation of round ligaments nor when the ligaments are seriously attenuated.
- 4. REEFING THE BROAD LIGAMENTS.
  - a. This lifts the uterus and adnexa.
  - b. Does not hold fundus uteri well forward.
- 5. SHORTENING OF SACRO-UTERINE LIGAMENTS (through the abdominal incision).
  - a. Draws the cervix uteri well back and upward in the pelvis, which is an important consideration in cases in which the cervix comes far forward.
  - b. When used alone it does not satisfactorily elevate and hold forward the fundus uteri and adnexa. It is used when necessary in combination with some anterior operation for holding the fundus forward.

C. Through the Vagina. The vaginal operations in general have the advantage that they are easily combined with the vaginal work previously mentioned as necessary in a considerable proportion of the cases of retrodisplacement. Again, there is less handling of peritoneal surfaces and, consequently, less shock and less danger of peritonitis.

On the other hand, they have the disadvantage that they do not provide for satisfactory elevation of the fundus uteri and adnexa nor for the decided pull forward and upward that is necessary when there is a strong backward tendency. Again, pathological conditions in the pelvis or lower abdomen can not be so well determined nor so safely and accurately treated.

- 1. VAGINO-FIXATION. The peritoneal cavity is opened by anterior vaginal section and the fundus uteri fastened forward by sutures passing through the vaginal wall and the anterior surface of the uterus.
  - a. Fixes the fundus uteri well forward and throws the cervix backward.

   - b. Does not provide for satisfactory elevation of the uterus and adnexa.
   - c. Uncertainty of ultimate result. As formerly carried out it caused serious trouble in pregnancy. Improvements in the technique have lessened this danger, but have not eliminated it entirely.

     When the uterus is fastened forward securely enough to insure its staying there, an excessive amount of scar may form and cause trouble in pregnancy. On the other hand, when the operation is so conducted as to practically eliminate this danger, the fixation is likely to be insecure and there may be return of the displacement.

2. VESICO-FIXATION. The peritoneal cavity is opened by anterior vaginal section and the fundus uteri is brought forward and sutured to the vesical peritoneum.
   - a. Fundus brought well forward.
   - b. Does not provide for satisfactory elevation of the uterus and adnexa.
   - c. The peritoneal adhesions are likely to stretch and permit return of the displacement.
3. SHORTENING THE ROUND LIGAMENTS THROUGH VAGINAL INCISION, by folding them in various ways.
   - a. Brings fundus uteri forward.
   - b. Does not provide for satisfactory elevation of uterus and adnexa.
   - c. Uterus is suspended by the weak portion (distal portion) of the ligaments.
   - d. Direction of pull is lateral instead of forward.
4. ANTERIOR COAPTATION OF THE BROAD LIGAMENTS. The bladder is separated from the uterus, as in anterior vaginal section, and then the strong tissues in the lower part of each broad ligament are brought together in the median line in front of the cervix and sutured there. This operation promises much, both in cases of retrodisplacement and in prolapse of the uterus. It is a comparatively new operation, but there are already several modifications. Its effects are as follows:
   - a. Cervix is elevated and held well back in the pelvis. This is sufficient in some cases to keep the fundus uteri forward and to lessen the dragging sufficiently to relieve the symptoms.
   - b. It does not strongly elevate the fundus and adnexa.
   - c. Like the other vaginal operations, it fails to provide for the thorough exploration and operative treatment of pathological conditions in the pelvis and lower abdomen.
5. SHORTENING OF SACRO-UTERINE LIGAMENTS THROUGH A POSTERIOR VAGINAL INCISION.
   - a. Draws cervix well back and upward and throws fundus forward.
   - b. Does not satisfactorily elevate the fundus uteri and the adnexa.
   - c. Tubal and appendiceal complications cannot be so satisfactorily determined nor so accurately treated.

6. POSTERIOR VAGINAL SECTION, WITH PACKING OF CERVIX BACK TO FORM ADHESIONS (PRYOR).
    a. Cervix is fastened well backward and upward and the fundus pushed forward.
    b. Very uncertain as to whether satisfactory posterior fixation of the cervix will be secured. It may be tried when the cul-de-sac is opened for other cause. The packing may be used advantageously when the sacro-uterine ligaments are shortened by vaginal section.
    c. Does not provide for satisfactory elevation of the fundus uteri and adnexa.

Choice of Operation.

As to what operation is preferable in a particular case, that depends on the conditions present in that case.

When the uterus is freely movable and stays forward well with a pessary, but the wearing of the pessary is not satisfactory because of tenderness or nervousness or other discomfort, the uterus may be held forward by the extra-peritoneal shortening of the round ligaments (Alexander-Adams Operation) or by vesico-fixation. I think the former is preferable usually because it gives better elevation of the uterus and adnexa and also gives a more permanent forward fastening. The field of either of these operations is very limited, for most of the cases in which they are efficient may be satisfactorily treated with pessaries. When there is so much disturbance that a pessary is not satisfactory, there is usually some intra-abdominal condition that can be more satisfactorily handled by abdominal section which permits thorough exploration and direct treatment.

In those cases in which abdominal section is required, there comes the question as to "Which is the preferable method of fastening the uterus forward after the abdomen is open?" The answer to this depends on the conditions within the pelvis. These conditions vary widely in different cases of retrodisplacement, and in order to handle the cases intelligently they must be grouped into classes representing the principal pathological conditions. Then, for each class, that operation should be selected which best meets the requirements of that class.

This definite classification of the cases of retrodisplacement, with a clear comprehension of the obstacle to be overcome in each class, I consider a very important matter and one that must receive much additional study before the subject is thoroughly understood.

The matter of classification and the adaptation of the operative measures to the special conditions present in these different classes, is presented at some length in a recent article of mine.*

In respect to the conditions present in the pelvis, the cases may be divided into four classes, as follows:

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* The Preferable Method of Anterior Fixation of the Uterus When the Abdomen is Open. The President's Address, St. Louis Obstetrical and Gynecological Society. H. S. Crossen, M. D. Journal of American Medical Association, May 4, 1907.

1. Those in which the round ligaments and adjacent tissues are freely movable.
2. Those in which the round ligaments and adjacent tissues are fixed by inflammatory infiltration or other condition.
3. Those in which the cervix lies so far forward that the axis of the uterus still lacks the normal anterior direction even when the fundus is brought into the front part of the pelvis.
4. Those in which there is so much inflammatory infiltration and contraction of the posterior part of the broad ligaments, that the uterus can not be brought entirely forward, without danger of serious injury to important structures.

In each class the particular operative measure best suited to that class must be chosen. The preferable operative measures for each of the various classes is discussed in the article previously mentioned. From this same article I quote the following description of the operation which I find most useful in the cases of the first class. It is the Gilliam-Crossen Operation mentioned in the preceding classification of operative measures.

"1. The special work for which the abdominal cavity was opened having been completed, the left round ligament is grasped with an ordinary tenaculum-forceps, about 1½ inches from the uterus. The right ligament is caught in a similar manner with another forceps, and then any retractors that are in the way are removed from the abdominal wall. The grasping of the ligament of each side with the tenaculum-forceps facilitates the subsequent manipulation of the ligaments, after the removal of the retractors which expose the pelvic cavity.

"2. The point of the puncturing tenaculum-forceps (Fig. 601) is entered in the left side of the wound, just beneath the upper sheath of the rectus muscle and about one inch above the pubic bone. It is passed outward just beneath the sheath for an inch and then the point is directed downward and made to puncture the rectus muscle and posterior sheath, but not the peritoneum. Guided by the fingers in the abdomen, it is then passed outward between the peritoneum and the aponeurosis to a point about one inch from the internal inguinal ring, where it is made to penetrate the peritoneum. The handle of the instrument is then raised so as to direct the point toward the round ligament, and it is made to grasp the ligament and overlying peritoneum about 1½ inches from the uterus (Fig. 602).

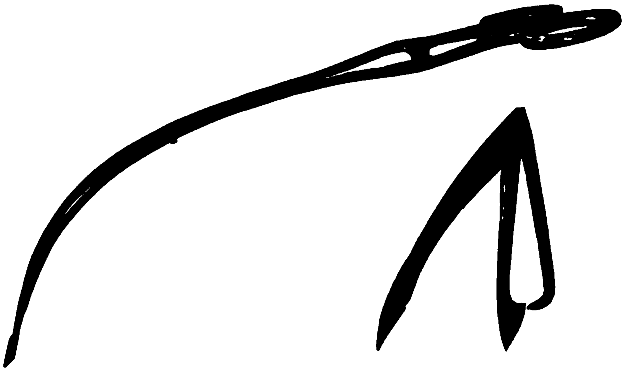

Fig. 601. The Puncturing Tenaculum-Forceps. The instrument is strongly made and slender, and is designed to pass easily through the tissues of the abdominal wall, to penetrate the aponeurosis and peritoneum at any desired point, to grasp the round ligament firmly without bruising it, and to return through the wall, bringing the ligament along the new canal. (Crossen—*Journal of American Medical Association.*)

"In the class of cases under consideration, the ligament and peritoneum are usually so stretched and lax that they are easily drawn into the new canal as a small cord. If the ligament is unusually thick or if the peritoneum is so thickened that it probably will not pass easily into the forceps canal, a window may be snipped in the peritoneum in front of the ligament and the ligament alone grasped and brought into the canal.

"3. The forceps is then withdrawn, bringing the ligament with it into the forceps-track and out at the abdominal wound (Fig. 603). The loop of ligament brought out is now caught and held by an ordinary tenaculum-forceps, while the right ligament is brought out in a similar manner with the puncturing tenaculum-forceps. After the ligaments are brought into position the tension is adjusted. It may be necessary to bring out a little more of the proximal portion or a little more of the distal portion, the former to bring the fundus well

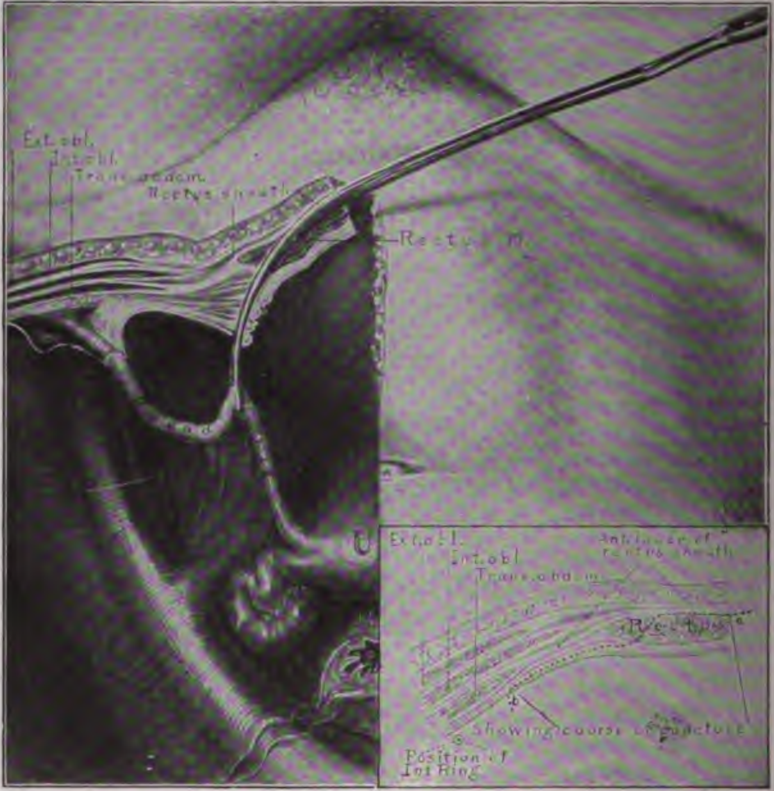

Fig. 602. The Puncturing tenaculum-forceps Introduced Through the Wall, as described, and grasping the round ligament. In introducing the forceps through the wall, the point is carried along the course indicated by the dotted line **a** to **b** in the small sketch in the corner. Notice that the puncture through the strong musculo-aponeurotic wall is made at the rectus muscle, while the puncture through the peritoneum is made at **b**, which is near the internal inguinal ring. The distance from **b** to the internal ring is so short (about one inch) that no puckering suture is necessary. This point is further explained in Fig. 603. (Crossen—*Journal of American Medical Association.*)

forward and the latter to close effectively any space that may exist between the distal portion and the parietal peritoneum. By paying attention to this latter point the peritoneal puncture may be made a considerable distance from the internal inguinal ring without leaving any opening through which an intestinal

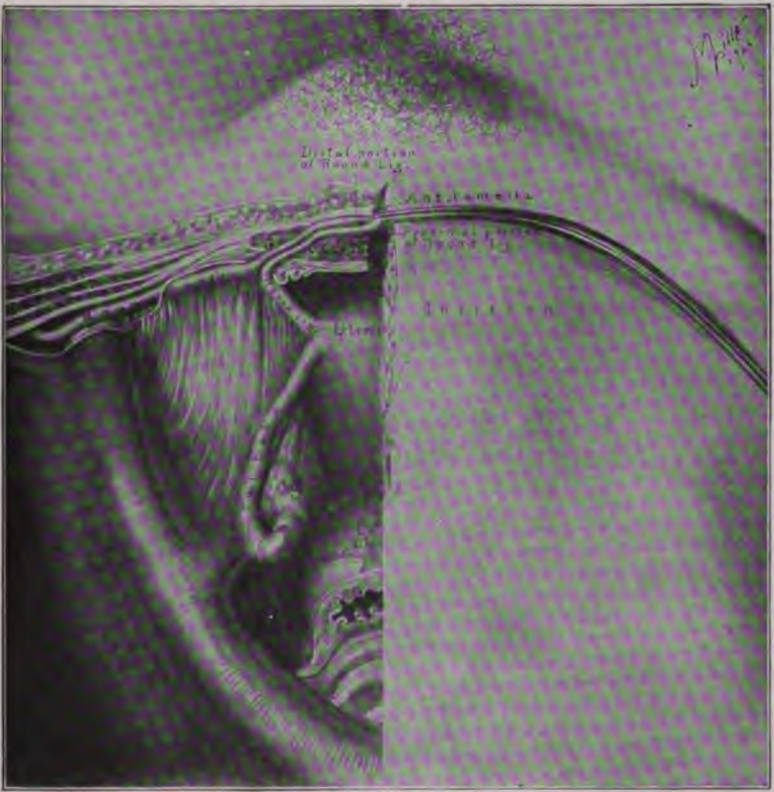

Fig. 603. The Left Round Ligament Drawn into Place. Notice that the direction of the pull on the uterus is changed from lateral to anterior. At the same time there is no large opening between the distal portion of the round ligament and the anterior abdominal wall requiring a suture, as in the regular Gilliam-Ferguson operation. The distance from the peritoneal exit of the new ligament to the lateral edge of the peritoneal cavity at this level is so small (represented in the corner sketch in Fig. 602 by the distance from **b** to the internal inguinal ring) that it is closed by moderate traction on the distal portion of the round ligament loop appearing in the wound. If it is desired to bring the uterus farther forward the proximal portion of the ligament is pulled on. If the peritoneum becomes tense before there is sufficient tension on the round ligament to bring the uterus well forward, the peritoneum over the ligament loop may be incised and the ligament itself grasped and drawn out as desired. (Crossen—*Journal of American Medical Association.*)

coil might slip. If doubtful on this point, the forceps may be carried to within half an inch of the ring or even practically to the ring before puncturing. The peritoneum, being freely movable on account of the loose subperitoneal tissue, is drawn nd puckered when the proximal portion of the ligament is drawn tense to bring the uterus forward. This brings the peritoneal exit near the aponeurotic exit of the new ligament, beneath the rectus muscle. The direction of the new ligament therefore is forward, practically the same as in the Gilliam operation.

"4. The ligaments are then fastened in their new position. If long enough, the loops are overlapped in the median line and fastened to each other and to the upper sheath of the rectus. If not long enough to reach to the median line, they are fastened securely in the forceps-track by catgut sutures passed through the upper sheath and the ligaments beneath. The abdominal incision is then closed in the usual way.

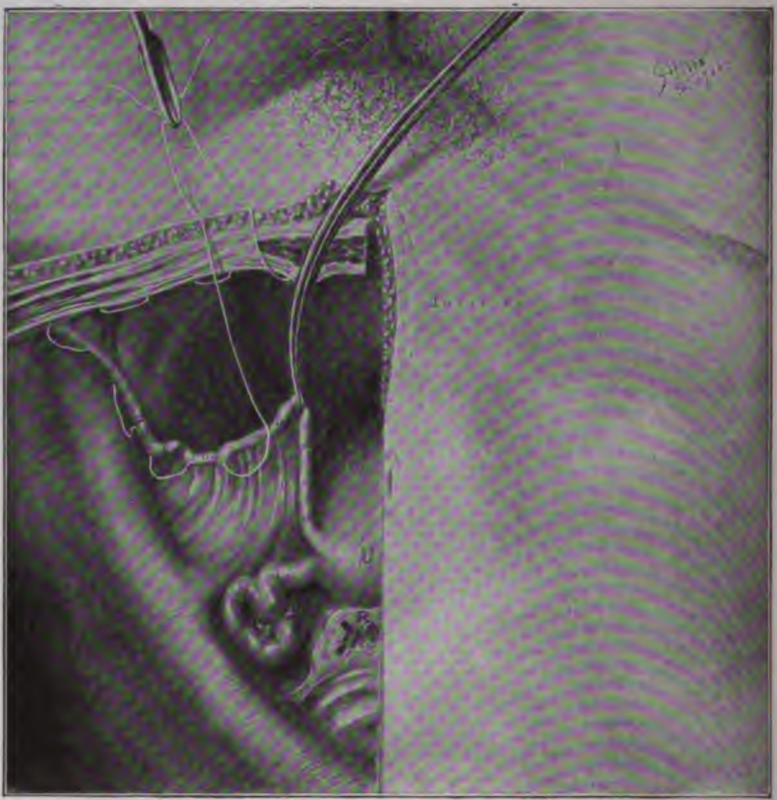

Fig. 604. The Use of the Puncturing Tenaculum-forceps in the regular Gilliam-Ferguson Operation. The puncture is made directly through the upper sheath, the rectus muscle, the lower sheath and the peritoneum, and the ligament is grasped and brought out —the puckering suture having been previously passed. After the ligament is brought out as desired, the puckering suture is tied, thus closing the opening at the side between the distal portion of the round ligament and the anterior abdominal wall. (Crossen—*Journal of American Medical Association.*)

By the method just detailed, the ligaments may be transplanted into the abdominal wall very quickly—giving a strong reliable forward and upward traction to the uterus and adnexa and without any free bands or dangerous adventitious openings. The advantages of this particular technique in suitable cases over the usual technique of the Gilliam-Ferguson operation is that it simplifies and expedites the work by doing away with the temporary ligation of the ligaments and also with the lateral puckering suture.

The puncturing tenaculum-forceps here mentioned may be used also with advantage in the regular Gilliam-Ferguson operation (Fig. 604). It may be used also in those operations in which the puncture of the aponeurotic wall is made practically at the internal inguinal ring, though care must be exercised that the deep epigastric vessels be not injured."

"I designed this puncturing tenaculum-forceps some time ago and after considerable experimenting arrived at the present form. I have been using it now for a year and have found it so convenient and satisfactory that I thought it worthy of presentation as a useful addition to our armamentarium.

"I have used it both with the ordinary longitudinal incision and with the transverse incision. It is strong and slender and is designed to pass easily through the tissues of the abdominal wall, to penetrate the aponeurosis and peritoneum at any desired point, to grasp the round ligament firmly without bruising it and to return through the wall, bringing the ligament along the new canal. Possibly some one has already described such a forceps; if so, it has escaped my notice. Both the Gilliam forceps and the Barrett forceps are radically different."

PROLAPSE OF THE UTERUS.

Prolapse of the uterus is that condition in which the uterus sinks decidedly below its normal level in the pelvis. It is known also as "procidentia uteri" and is frequently referred to by the patient as "falling of the womb."

ETIOLOGY AND PATHOLOGY.

The causes of prolapse are practically the same as those of retrodisplacement (see page 597). In fact, a slight prolapse is usually the first step in retrodisplacement.

The uterus normally has considerable up and down movement. Respiration causes movement of the uterus, which is noticeable during the speculum examination, especially with the patient in the Sims posture.

There may be considerable exaggeration of the usual downward displacement without any symptoms, and that could hardly be called pathological. The condition is not called prolapse unless there is marked downward displacement, and this is almost always accompanied with backward displacement of the uterus.

If the cervix is still well within the vagina, the condition is designated as prolapse of the FIRST DEGREE. If the cervix protrudes from the vaginal orifice it is called the SECOND DEGREE. If the uterus lies outside the pelvis it is called the THIRD DEGREE, or complete prolapse. See Figs. 287, 288, 289, 290, 291, 292, 293, 294, 295, 296.

In the usual case of prolapse, the uterus is found retrodisplaced and low in the pelvis, the pelvic floor is found lacerated and there is present more or less endometritis with discharge. The vaginal walls also are relaxed and thrown into folds by the position of the uterus, and may be found projecting outward at the vaginal opening, forming an anterior or posterior colpocele.

The projecting vaginal wall precedes the cervix on its downward journey. If the bladder follows the projecting vaginal wall, as it frequently does in severe prolapse, the condition is known as cystocele (Figs. 292, 293). In some cases of severe prolapse, the anterior rectal wall follows the projecting posterior vaginal wall, forming rectocele.

The cervix in many cases has been severely lacerated and is chronically inflamed and is the seat of cystic disease and of an irritating discharge. In severe prolapse, ulcers often appear on the cervix or vaginal walls, being due to irritation of the clothing and to interference with the circulation of the prolapsed portion. The interference with the circulation may be due to two factors—constriction of the prolapsed portion by the vaginal opening and stretching of the uterine blood vessels with consequent diminution in their calibre. All the ligaments of the uterus are stretched until they give practically no support, and the lower pelvis is occupied by the intestines instead of by the pelvic organs. Sometimes coils of intestine may lie in the cul-de-sac back of the uterus, outside the vaginal opening.

SYMPTOMS.

The symptoms of prolapse of the uterus are dragging pains in the back and pelvis, worse when walking, some protrusion at the vulva and sometimes difficulty in urinating. In some cases the protruding bladder must be pushed back into the pelvis before the patient can urinate. Even then there is more or less residual urine which is likely to lead to cystitis. Some patients complain of partial incontinence of urine when coughing or laughing. In exceptional cases, it is this partial incontinence that brings the patient to a physician, and he must recognize the cause or he will fail in the treatment.

Examination reveals as follows in the different degrees of prolapse:

First degree. The pelvic floor is relaxed and there is more or less protrusion of the vaginal walls. The uterus is usually retroverted and the cervix is low in the pelvis and far forward, near the vaginal opening. Coughing or straining cause the cervix to sink lower and the vaginal walls to protrude more.

If there is still doubt as to whether the uterus sinks low enough to be called prolapse or to cause symptoms, the patient may be examined in the standing posture (see page 50), but this is rarely necessary.

Second degree. The cervix is found presenting at the vulva (Fig. 288) and may be made to protrude by bearing down (Fig. 289). There is also protrusion of the vaginal walls and sometimes of the bladder.

The cervix and vaginal walls may return into the pelvis when the patient is lying down. There is more or less erosion about the cervix and sometimes ulceration.

Third degree. There is a mass nearly as large as the fist protruding from the vulva and lying between the thighs (Fig. 290). It is covered by the turned out vaginal wall which, from friction of the clothing, has become dry and hard resembling ordinary epidermis. At the lower part of the mass is the cervix, which is represented by a hard nodule with an opening in the center and more or less erosion or ulceration about it. The appearance of the cervix depends upon how much laceration of the cervix there has been.

Grasping the mass and palpating it to determine its contents, there is found a hard elongated mass—extending upward from the cervix. Usually the size and shape of the uterus can be accurately made out. From the cervix there is more or less discharge which may be clear and glairy, resembling the white of an egg, or it may be muco-purulent.

If the bladder has prolapsed also, it is felt as a thick cushion of soft tissue in front of the hard uterus (Fig. 292). To determine just how much the bladder is displaced, a sound may be introduced into it and the outline of the cavity thus determined (Fig. 293). The vaginal wall often presents spots of ulceration, especially about the cervix (Fig. 290), and there is often much irritation over the whole prolapsed mass and about the external genitals.

DIAGNOSIS.

The diseases from which prolapse must be differentiated are as follows:

1. **Hypertrophy of cervix.** In this condition, the body of the uterus is felt nearly at its normal height in the pelvis. Also the depth of the uterus is increased, the amount of increase depending on the length of the hypertrophied cervix. Furthermore, the posterior vaginal wall is usually not pushed down, as it would be by a prolapse of the uterus, and the bladder is usually not involved in the projecting mass. See Figs. 298, 299, 300, 301, 302.

2. **Tumor or Cyst of Vagina.** Anything that causes the vaginal walls to swell over a limited area and protrude, may be mistaken for prolapse of the uterus, for example, vaginal cyst, vaginal hernia, or tumor of vaginal wall. In all these conditions, by careful digital examination, the cervix may be felt above the projecting mass and near its normal position. See Figs. 305, 306, 326, 327.

3. **Tumors of uterus, projecting from cervix.** Such tumors are, of course, more or less pediculated and almost invariably they are fibroids. In such cases, there is felt near the vaginal entrance, a mass, which may be hard or soft. If the mass is sloughing, part of it will be soft. No cervical opening can be felt in the mass and, by exploring higher around the mass, the cervical ring can be felt at the upper part of the vagina. If the tumor is sloughing, there is usually bleeding and a very offensive discharge. Furthermore, by bimanual examination, the body of the uterus may be felt near its normal position. See Figs. 303, 307, 308, 309, 310, 311, 325.

4. **Inversion of uterus.** In a case of inversion, a large mass, apparently a tumor, is felt in the vagina. The vaginal walls can be felt extending up past the mass. If it is sloughing, there will be bleeding and a foul discharge. Furthermore, the body of the uterus is not felt where it ought to be (Fig. 322). It is apparently nowhere in the pelvis, and by deep bimanual examination a depression may be felt with the abdominal hand at the upper end of the vagina—a cup-shaped depression with a hard margin, where the body of the uterus should be (Fig. 323). **Inversion differs from a tumor, in that a sound can not be introduced far into the**

uterus, for the cavity is more or less obilterated (Fig. 324). **See also Figs. 304, 312, 313 to 321, 325.**

TREATMENT.

The means of treatment may be divided into two classes—palliative and curative.

Palliative Measures.

The palliative measures make the patient more comfortable, by relieving the irritation which cases the ulceration and by diminishing the dragging on the uterine supports.

1. Treatment of the ulceration and erosion, and reduction of the mass. All secretion should be cleansed from the extruded mass and from the adjacent surfaces. Areas of ulceration or erosion should be touched with some astringent silver preparation or with 10% copper sulphate solution, and dusted with an antiseptic-astringent powder.

The mass should then be anointed with an antiseptic ointment and reduced within the pelvis. By bimanual manipulation, the backward displacement should be corrected as far as possible, the fundus being brought forward and the cervix pushed far back in the pelvis.

2. Pessaries and Tampons. The next step is to hold the uterus in the pelvis as near its normal position as possible. If there is enough left of the pelvic floor to hold a pessary, that should be tried.

The style of pessary preferred in suitable cases is that used for retrodisplacement (Fig. 452), for the object is to keep the fundus uteri in the forward position. As long as the fundus is forward and the cervix well back in the pelvis, the organ can hardly prolapse, at least not to the extent of coming outside. This form of pessary is effective only in cases of slight prolapse. In cases of marked prolapse, the above mentioned pessary fails, because the pelvic floor has been too much stretched to hold the pessary in place. The anterior end of the pessary slips down to the wide part of the pubic arch and slips out of the dilated vaginal opening. In such a case the inflated ring pessary (Fig. 460) will sometimes holds the uterus within the pelvis. The Menge pessary (Fig. 461) is sometimes effective where those above mentioned fail.

The most generally satisfactory pessary for severe prolapse is the Gehrung pessary (see p. 342 and Figs. 362-365), when one knows how to use it. I have found it so effective that for several years I have used it to the practical exclusion of other pessaries in those cases of severe prolapse which cannot be subjected to operation.

In those rare cases in which none of the above pessaries will keep the uterus within the pelvis, and the patient refuses curative operative measures, the cup and belt pessary may be used. In some cases this makes the patient fairly comfortable, and with proper care may be worn indefinitely. In other cases it causes so much distress, by pressure on the vaginal walls or cervix or other pelvic structures or by irritation from the abdominal or perineal bands that the patient abandons it after a trial.

3. Tampons, Rest in Bed, Astringent Douches. Where no form of pessary will hold the structures back, a firm vaginal packing of gauze or cotton tampons may be placed, preferably with the patient in the knee-chest posture or in Sims' posture. This packing will hold the uterus up temporarily and, by placing a pad over the vulva and holding it firmly in place by a strong T-bandage, the packing may be kept in place two days. This method is very useful when treating the ulceration often found about the cervix and also to give temporary relief while preparing the patient for operation.

If the patient can spare the time to go to bed and remain there a week or two, taking astringent douches when not packed, she will experience considerable relief from pain and discomfort. This is especially important when there is ulceration of the cervix or vagina requiring treatment.

Curative Measures.

These are all operative and may de divided into two classes—(a) those that preserve all the genital functions and (b) those that do not.

A. Genital Functions Preserved. The uterus and adjacent structures are restored to approximately normal position and all the genital functions are preserved.

1. FASTENING OF FUNDUS UTERI FORWARD AND UPWARD, AND REPAIR OF PELVIC FLOOR. The body of the uterus is brought forward and elevated and the fundus is fastened in the desired position by one of the methods detailed under retrodisplacements. The pelvic floor is thoroughly repaired by one of the methods detailed in chapter V. A curetment is usually combined with the above measures to reduce the weight of the uterus, and if the cervix is sufficiently enlarged or elongated, a part of it is amputated (see chapter VI).

All this may be done at one anesthesia or it may be divided into two operations some weeks apart, as thought best in the particular case. These measures are carried out in such a way that the function of pregnancy and parturition is not interfered with. In fact, the chance of pregnancy is increased by the restoration of the uterus to its normal position.

Practically all cases of prolapse in the child-bearing period can be treated satisfactorily in this way, where the form of operation best adapted to the particular case is selected and the proper technique employed. There are exceptional cases, but they are very rare.

2. BRINGING A STRONG PORTION OF THE LOWER PART OF EACH BROAD LIGAMENT IN FRONT OF THE CERVIX UTERI AND FASTENING IT THERE. This is accomplished through an incision in the anterior vaginal vault. It promises much in these cases, especially when combined with shortening of the sacro-uterine ligaments and operation for cystocele and repair of the pelvic floor. It has not yet been long enough in use to demonstrate certainly how well the shortened broad-ligaments will stand the strain.

B. Genital Functions Sacrificed. The uterus is removed or partly removed or so placed that pregnancy would be dangerous. These measures are, of course, applicable only to patients past the menopause or in the menopause, or in whom for some reason pregnancy can not again occur.

1. UTILIZATION OF THE UTERUS TO OVERCOME PROLAPSE OF BLADDER AND VAGINAL WALLS (Freund, Fritsch, Watkins, Wertheim.) Through an incision in the anterior vaginal wall, the bladder is separated from the vagina and uterus, and pushed up. Then the fundus uteri is brought forward beneath the bladder and fastened securely to the anterior vaginal wall. The redundant portion of the anterior vaginal wall is cut away. The sutures extend deeply at the sides so as to unite the firm lateral tissues to the uterus and thus gives good support to the bladder and other structures above. This, at the same time, turns the cervix into the posterior part of the pelvis and puts the vaginal walls on the stretch and prevents their prolapse. This is combined with a strong repair of the pelvic floor. The special steps and the various modifications, it will not be necessary to detail here.

This operation has several advantages over hysterectomy and, if the results eventually prove lasting and satisfactory, will probably largely replace it as a cure for prolapse.

2. Hysterectomy, Either Vaginal or Abdominal, with High Fixation of the Vaginal Stump, and followed by repair of the pelvic floor either at the same sitting or later.

I would call particular attention to the fact that hysterectomy fails in many cases to cure the prolapse of pelvic structures unless particular care is taken to fasten the vaginal stump very high. Without this precaution, the vagina is liable to prolapse again. The intestines and bladder also come down and the last state of the patient is worse than the first. This defect of the old vaginal hysterectomy for prolapse, I pointed out, and illustrated by cases that came to me from other operators, some years ago, when that operation was at its height as a cure for this affection.*

Hysterectomy as mentioned above, however, with high fixation of the vaginal stump (to the broad ligament stumps or to the anterior abdominal wall), is a different proposition and is effective in relieving the distressing symptoms.

OTHER DISPLACEMENTS OF UTERUS.

Anteflexion of the Cervix Uteri. In this affection the cervix uteri is bent forward so that the axis of the cervix is directed along the vaginal canal instead of across it. The axis of the cervix forms a sharp angle with that of the corpus uteri, the point of bending being at about the internal os.

Anteflexion of the cervix uteri is nearly always a developmental defect, due to the persistence of the fetal position of the cervix uteri, as explained when considering the anatomy of the uterus at different periods of life (see chapter VI).

Almost the only symptom of anteflexion of the cervix is dysmenorrhoea, and therefore I have thought best to consider the subject in detail in chapter XIV, under the "neuro-trophic" form of dysmenorrhoea.

Anteflexion of the Corpus Uteri, Anteversion of the Corpus Uteri and Lateral Displacements of the Uterus can hardly be classed as diseases. They occur only as symptomatic disturbances in the course of other diseases, and of themselves do not give rise to symptoms nor require treatment.

Inversion of the Uterus. This serious and rare displacement is an obstetrical affection. It practically always occurs in the puerperal state, except when due to the dragging weight of a tumor. When due to a tumor, it simply constitutes one of the pathological conditions incident to the tumor (Fig. 310, 325) and does not require separate consideration.

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* Vaginal Hysterectomy for Prolapsus, by H. S. Crossen, M.D. Western Medical & Surgical Gazette, 1898.

CHAPTER VIII.

NON-MALIGNANT TUMORS OF UTERUS.

FIBROMYOMA OF THE UTERUS.

Fibromyoma of the uterus is a tumor composed of fibrous and muscular tissue. It is called also uterine "fibroid" and uterine " myoma."

ETIOLOGY.

The essential cause is not known. Some interesting theories have been advanced, but they are still theories only. The tumor is analogous to those growths which frequently enlarge the prostate in the male. As bearing on the etiology of uterine fibromyomata, it may be noted that they are usually multiple, there being but few exceptions to the rule that where there is one palpable fibroid there are many smaller nodules. They occur most frequently in middle life (period of sexual activity), though they may occur at any age. Again, child-bearing apparently has no influence in causing them. This is in marked contrast to carcinoma, particularly carcinoma of the cervix, which occurs almost exclusively in women who have borne children or who have had some injury to the cervix.

PATHOLOGY.

1. Composition. A fibromyoma is composed principally of connective tissue and involuntary muscular tissue—the same tissues that compose the uterine wall. In a small proportion of fibroids there are found small irregular cavities resembling glands and lined with epithelium. Such tumors are designated by the term "adenomyoma."

2. Relation to uterine wall. The fibroid starts as a small nodule in the muscular layer of the uterine wall. As it enlarges there usually develops a distinct capsule, or layer of condensed tissue, which separates the tumor proper from the normal uterine wall surrounding it (Figs. 605, 606, 607). From this capsule it may be easily shelled out, except when there has been inflammatory infiltration of the capsule and tumor. As long as the tumor is surrounded by the muscular tissue of the wall, it is known as an intramural or **interstitial fibroid** (Figs. 605, 606, 607.) They comprise 60 to 70 per cent of the cases.

As the ordinary encapsulated tumor grows, it pushes in the direction of least resistence, stretching the muscular tissue around it and tending to push the muscular tissue aside. When it pushes aside the muscular tissue to the outer side of it and comes to lie just beneath the peritoneum, it is known as a subserous or **subperitoneal fibroid** (Fig. 375). They comprise 20 to 30 per cent of the cases.

This process of escape from the grasp of the muscular tissue may progress, the tumor projecting farther and farther beyond the outline of the uterus but still covered by the peritoneum, until it is attached to the uterus only by a comparatively narrow band of tissue, or pedicle, carrying the blood vessels and covered by peritoneum. It is then a **pediculated subperitoneal fibroid** (Fig. 375).

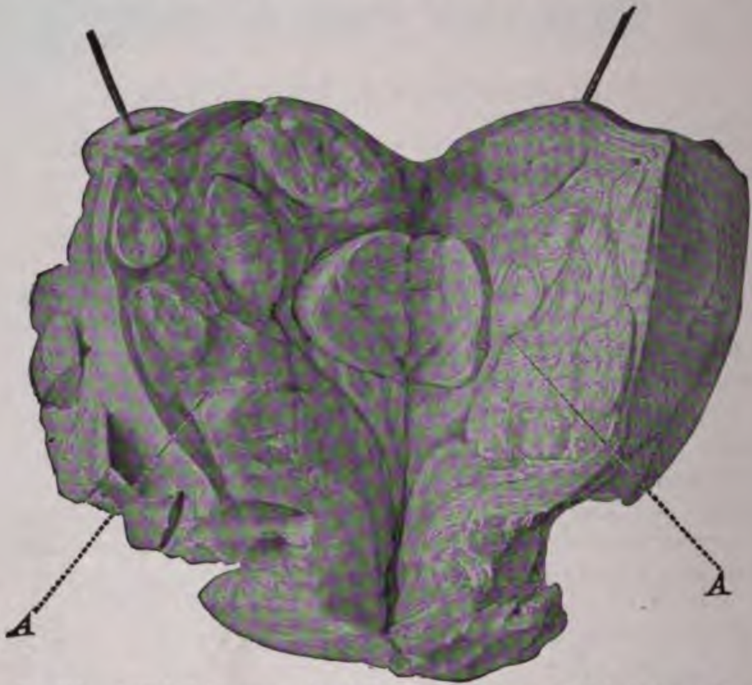

Fig. 605. Multiple Fibromyomata of the uterus. A. The divided uterine cavity. (Bishop—*Uterine Fibromyomata.*)

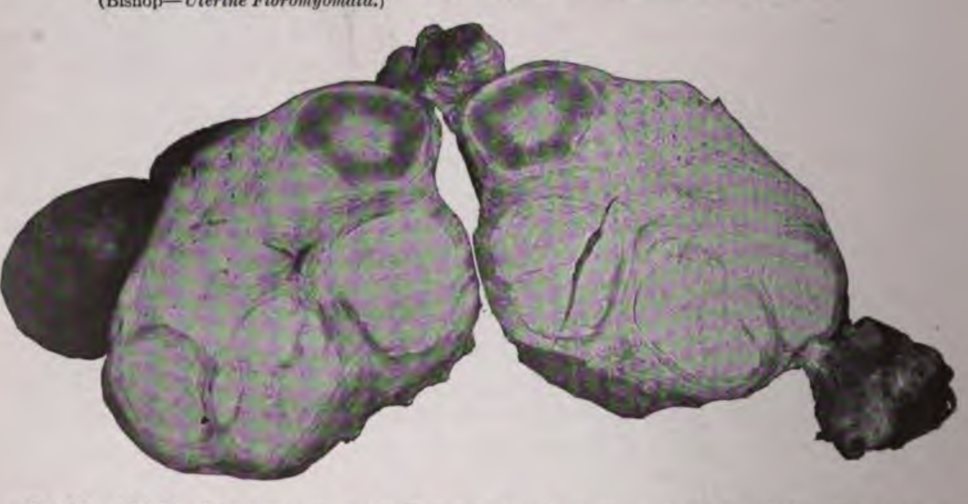

Fig. 606. Multiple Fibromyomata of the Uterus, sectioned so as to show the relation of the tumor-masses to the uterine wall. The encapsulation of the fibroid nodules is well shown. To the extreme left is a subperitoneal fibroid (not sectioned). The top of the uterine cavity is seen near the center of the left half of the sectioned mass.

In some cases adhesions to adjacent structures are formed, and through these adhesions the tumor may receive part of its blood supply. Occasionally the pedicle of such a tumor is severed by torsion or otherwise and the tumor is thus entirely separated from the uterus and receives its blood supply through the vascular adhesions. Such a tumor is known as a detached or "parasitic" or **wandering fibroid,** and constitutes one of the curiosities of pathology.

If a tumor which is escaping outward from the grasp of the muscular wall is so situated that it projects into the broad ligament, it is known as an **intraligamentary fibroid.** If it projects in such a situation that it raises the peritoneum behind the uterus and passes back of the peritoneum, it is then called a **retroperitoneal fibroid.**

On the other hand, the fibroid, as it develops, may push its way inward instead of outward, and may come in time to lie beneath the endometrium, where it is known as a **submucous fibroid** (Figs. 605, 357). Submucous fibroids comprise about 10 to 15 per cent of the cases.

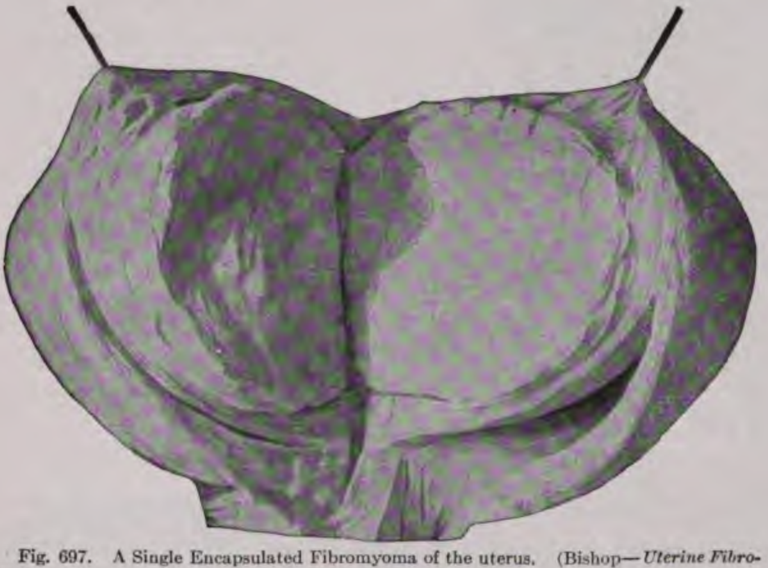

Fig. 697. A Single Encapsulated Fibromyoma of the uterus. (Bishop—*Uterine Fibromyomata.*)

The submucous fibroid may project farther and farther into the uterine cavity, until it is attached to the uterine wall only by a narrow pedicle (**pediculated submucous fibroid**—Figs. 309, 325). A pediculated submucous fibroid may be forced out into the vagina while still attached to the uterine wall (Figs. 308, 309) and may in this way cause partial or complete inversion of the uterus (Figs. 315, 325), a fact that must be kept in mind when removing such a growth by operation.

Some fibroids, especially the adenomata, are without a distinct limiting capsule. The tumor tissue blends directly with the uterine wall (Fig. 608). Such a tumor is called a **diffuse fibroid.** It may occupy only a small area or may extend all the way around the uterine cavity.

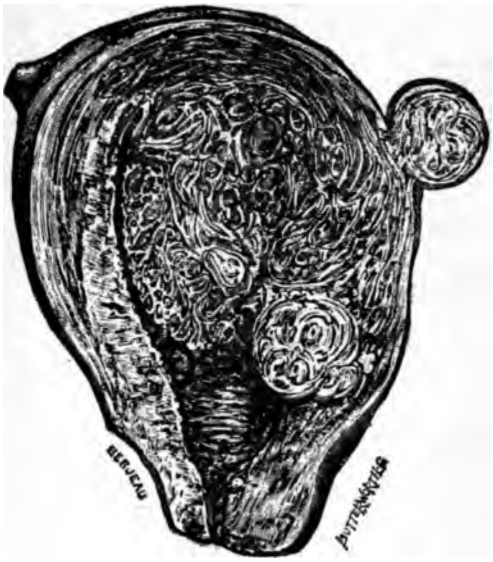

Fig. 608. A Diffuse Adeno-myoma of the Uterus. (Bland-Sutton—*Hysterectomy.*)

Most fibroids are found in the body of the uterus, as indicated in the various illustrations.

In a certain proportion of cases, the fibroid is situated in the cervix. Bland-Sutton found in a series of 500 cases, that 5% were **cervix fibroids.** These are more often single, and rarely project into the cavity, as the cervical cavity is small. They are usually comparatively small, but sometimes reach a size of 8 lbs.

4. Secondary Changes. Under composition is given the primary structure of the various forms of fibromyoma. In many cases there are found secondary changes in the tumor structure. These changes are edema, myxomatous degeneration, necrobiosis, necrosis, suppuration, cystic degeneration, calcification, malignant degeneration and other rarer changes (atrophy, fatty degeneration, amyloid degeneration). The relative frequency with which the more important of these secondary changes has been noted in operated cases, is shown in the table on page 655. Necrosis and suppuration are shown in Figs. 609, 610 and 611. Cystic change is shown in Figs. 426 and 612. Sarcomatous development is shown in Figs. 613 and 614.

5. Complications and Associated Diseases. These are very numerous and very important, for a large proportion of the deaths and of the suffering in fibroid cases, comes from them. Some of these conditions are due directly to the fibroid, some are due indirectly to it and some have no etiological connection with the fibroid, but are only associated affections. Some of them can not be assigned exclusively to one group or the

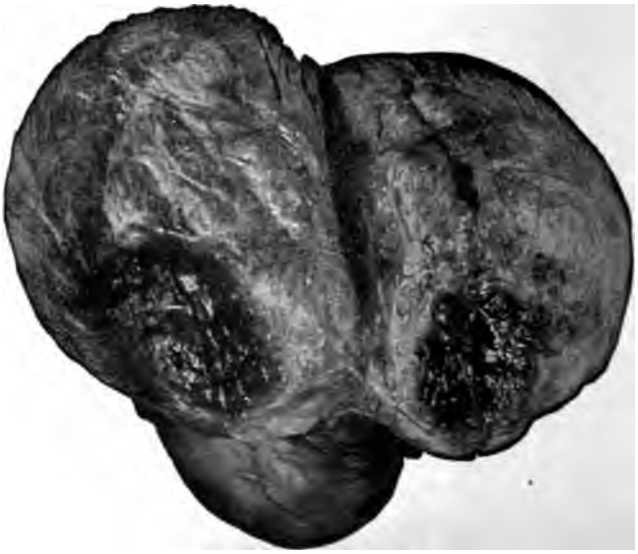

Fig. 609. Necrosis of an Intraligamentary Fibromyoma. (Hirst—*Diseases of Women.*)

other, so I think best to consider them all together. For convenience they are divided into three classes according to locality—(a) in the uterus, (b) in adjacent structures and (c) in distant organs.

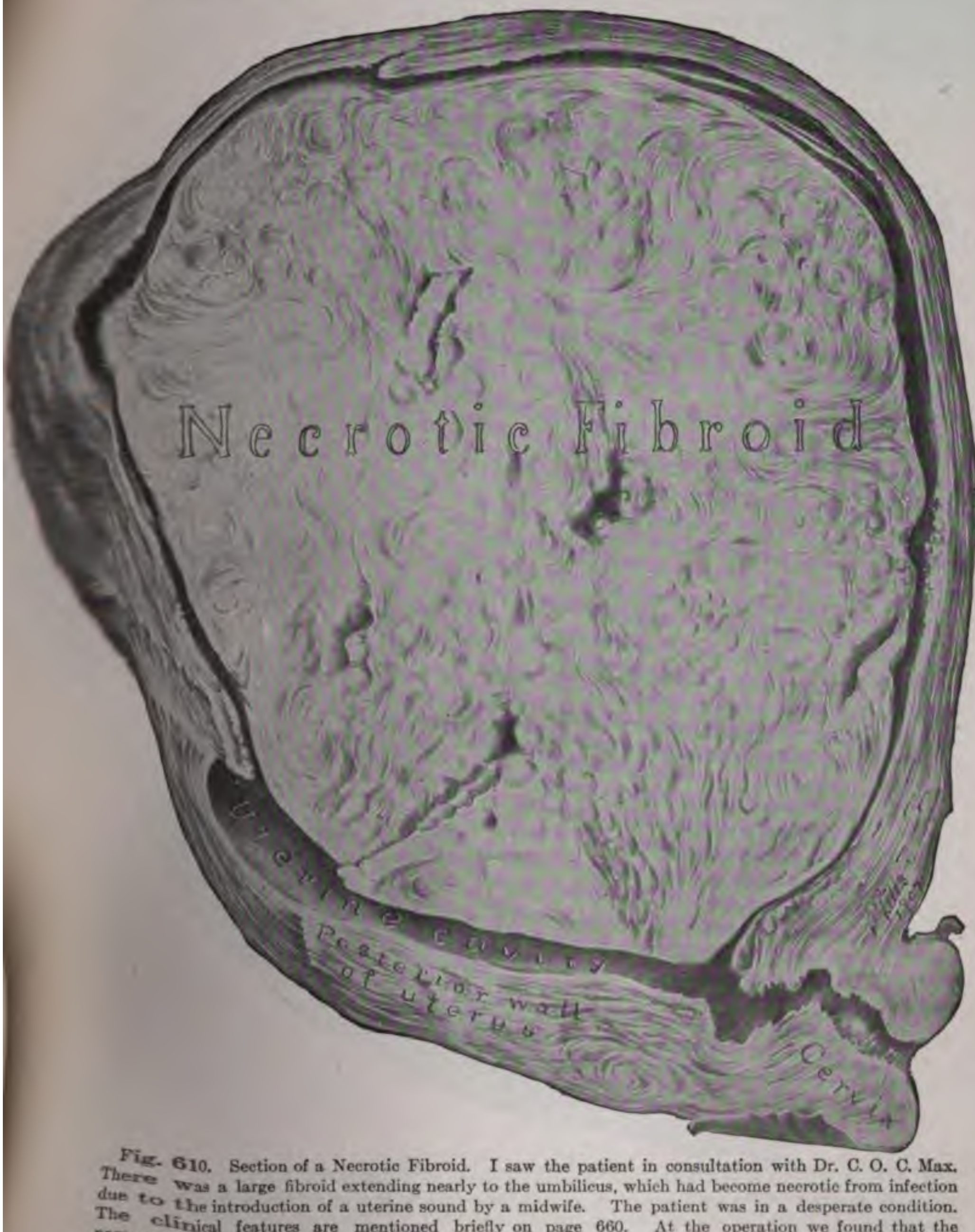

Fig. 610. Section of a Necrotic Fibroid. I saw the patient in consultation with Dr. C. O. C. Max. There was a large fibroid extending nearly to the umbilicus, which had become necrotic from infection due to the introduction of a uterine sound by a midwife. The patient was in a desperate condition. The clinical features are mentioned briefly on page 660. At the operation we found that the necrotic fibroid had perforated the uterine wall and was in contact with the omentum. This Anteroposterior Section of the removed Uterus and Tumor shows accurately the relation of the necrotic mass to the uterine wall. It was almost free in its suppurating bed. Fig. 611 shows the perforation through the uterine wall.

a. In this class come thickening of the endometrium, distortion of the uterine cavity and displacement of the uterus.

b. Here are found salpingitis, hydrosalpinx and pyosalpinx. Also, compression of the ovaries, with inflammation and sometimes hematoma. There may be

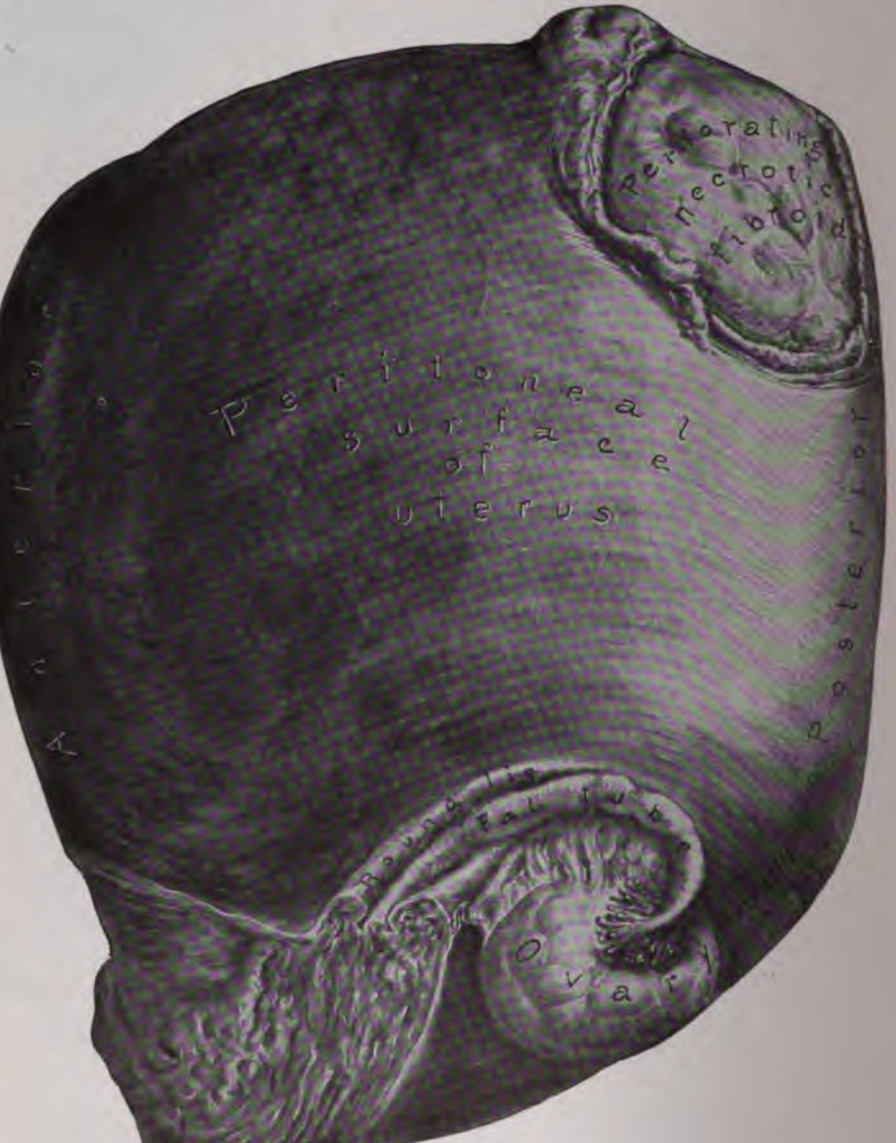

Fig. 611. A Necrotic Fibroid Perforating the Uterine Wall. Same specimen as shown in Fig. 610. The specimen consists of the uterus and tumor removed by total hysterectomy. The patient recovered. The Perforation here shown was covered by adherent omentum. As soon as the omental adhesions were separated, pus from the suppurating bed in which the necrotic mass lay poured into the peritoneal cavity. The tumor was large and the perforation was at the top of the mass, near the umbilicus.

troublesome pressure on the bladder or rectum or pelvic blood vessels. In some cases there is marked displacement of the bladder (Fig. 615).

c. The changes in distant organs concern principally the heart and the kidneys. These changes are often serious. They are mentioned at some length below, in considering the dangers from long-standing fibroids (see page 650).

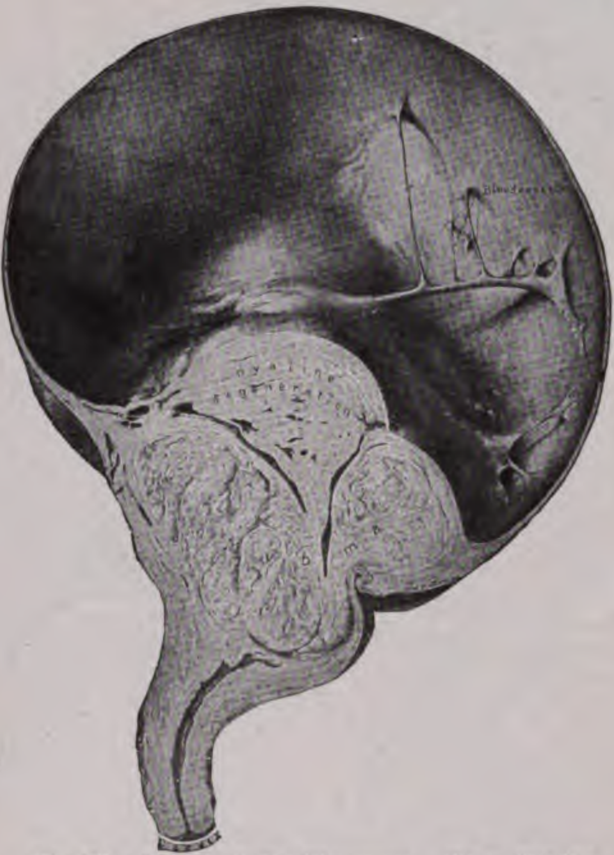

Fig. 612. A Large Cystic Fibromyoma. (Kelly—*Operative Gynecology*.)

SYMPTOMS AND SIGNS.

Symptoms.

The symptoms given by the patient are, in the usual order of their appearance, (1) menorrhagia, (2) leucorrhoea, (3) pressure symptoms, (4) pain and (5) a lump in the lower abdomen.

1. Menorrhagia. This is usually the first disturbance noticed, particularly in submucous and interstitial growths. There is much variation in the menstrual disturbance. Usually the flow is increased, but sometimes it is diminished. Emmet, in a series of 216 cases, found the menstrual flow decidedly increased in 50%, unchanged in 20%, lessened in 16% and irregular in 13%.

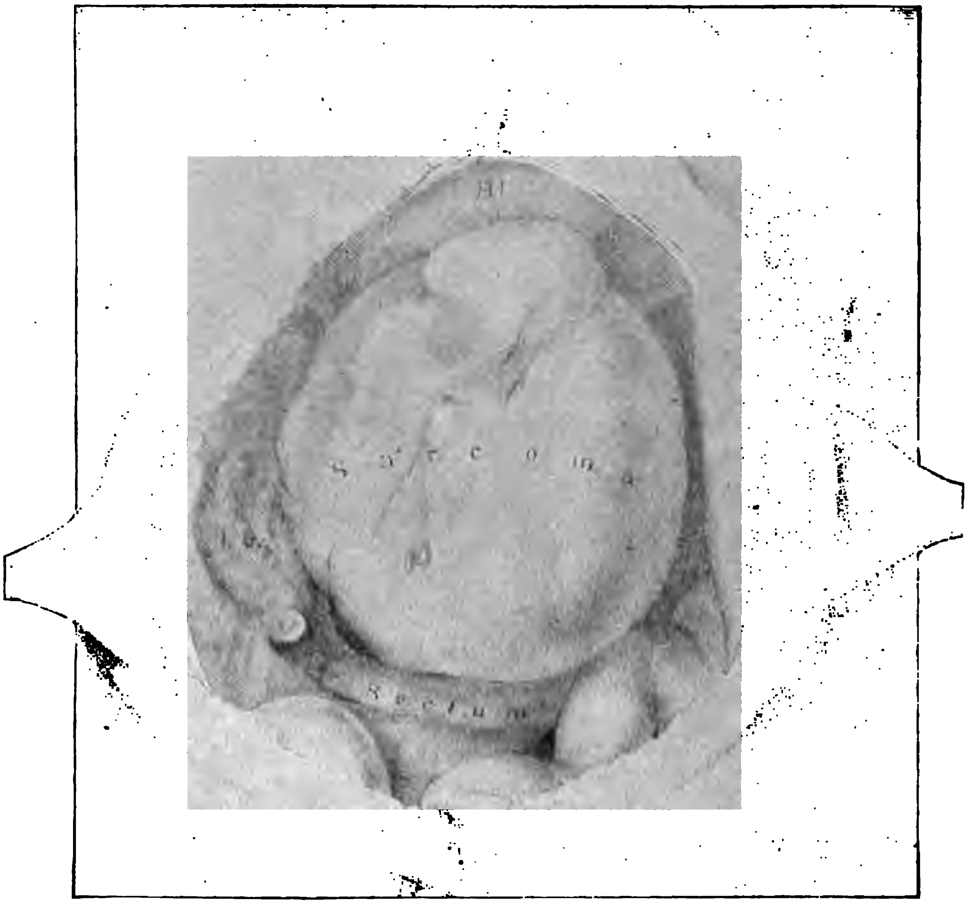

Fig. 613. A Sarcoma Developing in a Cervical Stump. The pelvis is viewed from above. Rising from the pelvis between the bladder and the rectum is a smooth lobulated growth. To the left is the intact and normal left ovary. The right appendages were removed at the first operation. The first operation was supravaginal hysterectomy for Fibromyoma. The original tumor is shown in Fig. 614. (Cullen—*Journal of American Medical Association.*)

2. **Leucorrhoea** is usually present after a time, especially in the submucous and interstitial growths. This is due to the accompanying chronic simple endometritis.

3. **Pressure symptoms.** These are indefinite, simply an indication that there is

some slight disturbing element in the pelvis. The patient has some bladder irritability and a feeling of weight in the pelvis. There is usually constipation. After the tumor becomes large, marked pressure symptoms occur.

4. Pain. This appears later. It is usually present as a backache (lumbar or sacral) or as pain in the lower abdomen or as thigh-pain on one or both sides. The pains usually come and go at first, and are worse when the patient is on her feet and also at the menstrual periods.

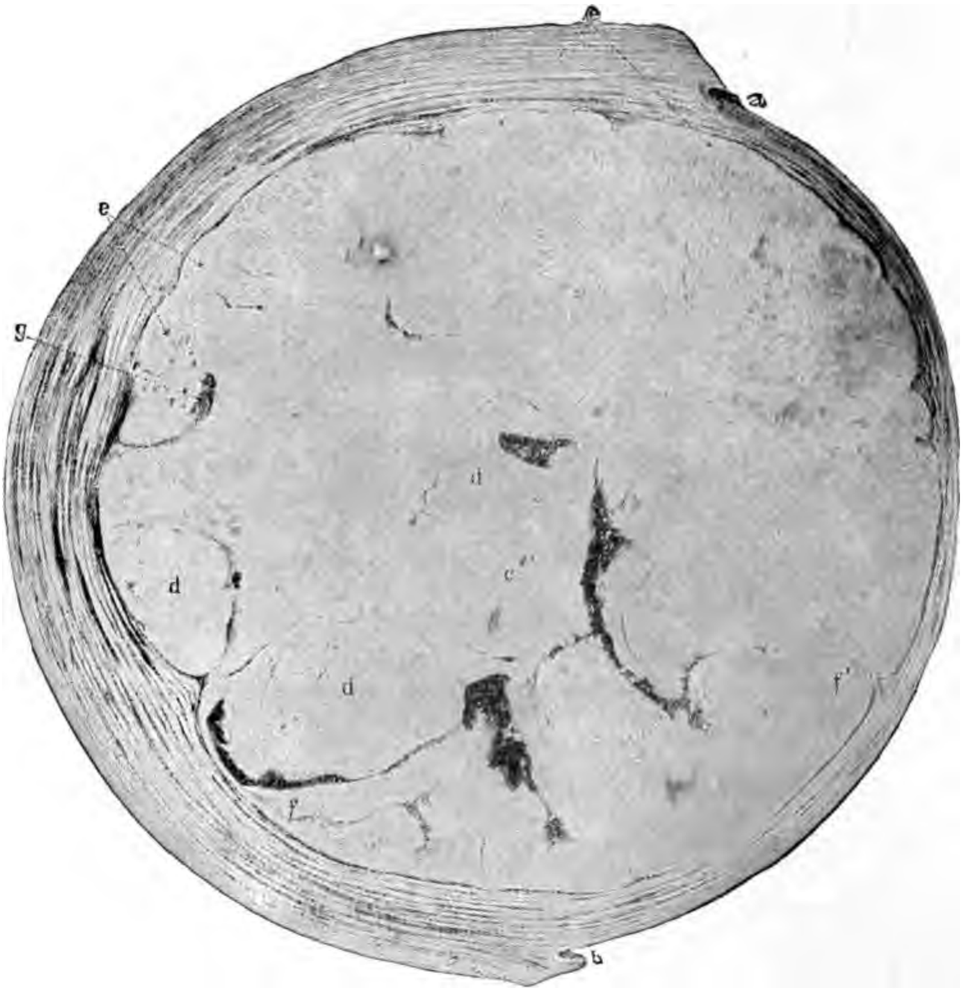

Fig. 614. The Fibromyoma removed in the Supravaginal Hysterectomy mentioned under Fig. 613. After the development of the sarcoma in the cervical stump, the original tumor (supposedly a simple fibroid) was sectioned as here shown. Several large areas of sacromatous degeneration were found, the most marked of which are indicated by the letter d. (Cullen—*Journal of American Medical Association.*)

5. Lump. In a large proportion of the cases, after some months or years, a lump is noticed in the lower abdomen. If the mass is smooth, however, it is surprising how large it will sometimes get before the patient notices it. Of course a mass with nodular projections is usually noticed as soon as it begins to distend the lower abdomen. In a certain proportion of cases, the mass even when large is still too deeply placed in the pelvis to be appreciable to the patient, and in some cases (small submucous fibroid) the mass is not appreciable to the physician, even on careful bimanual examination, though there may be much bleeding and distress.

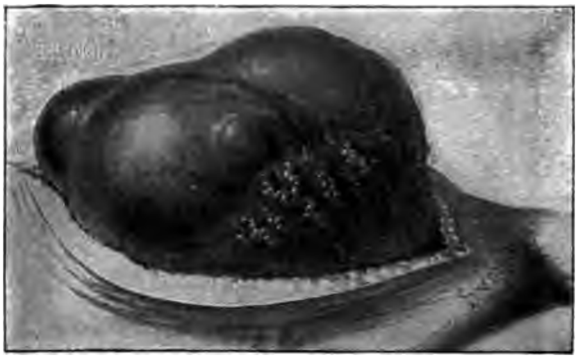

Fig. 615. A Large Fibromyoma of the Uterus, which has drawn the Bladder far up into the abdomen. Notice the immense veins on the peritoneal surface of the bladder. (Kelly—*Operative Gynecology.*)

Examination Signs.

The diagnosis of uterine fibroid must rest on the examination findings, for the symptoms are not distinctive. Taking up the Points as given in the Diagnostic Table (pages 287, 288), we find as follows in the case of a fibromyoma:

1. Position of mass. In the central part of the pelvis and extending from there toward one side.

2. Size of mass. May be any size, from one barely palpable in the wall of the uterus to a large tumor filling the abdomen.

3. Shape. Individual tumors are apparently spherical, but as they project from the uterus or grow beside each other, they form a mass of very irregular contour, usually presenting several distinct bosses or rounded projections outside the general outline of the mass.

4. Consistency. Firm, usually much harder than the adjacent uterine wall. Occasionally, part of a tumor will undergo cystic change—but even then the greater part of the mass is usually solid.

5. Tenderness. Not tender, unless incarcerated in pelvis or pressing on nerves or accompanied with inflammation.

6. Mobility. The tumor and uterus are movable together up and down in the pelvis, but they are not movable separately unless the fibroid is pediculated.

7. Attachment. Attached in the uterine region and free elsewhere, unless complicated. A subperitoneal fibroid with a long pedicle may be mistaken for a growth from some of the abdominal organs. The pedicle connecting the mass with the uterus, can usually be felt on deep bimanual palpation. In a difficult case, a useful expedient is to have an assistant grasp the tumor and draw it up into the abdomen while the examiner makes deep bimanual palpation in search of the pedicle, which is thus made tense and is easier felt (Fig. 103).

8. Apparent point of origin. From uterus. Occasionally a fibroid becomes

detached from the uterus or has such a long pedicle that it appears free, but that is rare.

9. Relation to uterus. Intimately connected to the uterus, growing from the same. May be from any part, usually from body.

10. Position of uterus. May be displaced in any direction, may be in normal position.

11. Size of uterus. Enlarged by tumor in wall, cavity lengthened. But do not explore with sound unless necessary.

12. Shape of uterus. Usually distorted and presenting one or more distinct projections. Occasionally symmetrically enlarged.

13. Consistency of uterus. Uterine tissue proper of normal consistency, but fibroid nodules harder. Occasionally a tumor will present a softened area (edematous) or a fluctuating area (cystic). Occasionally the cervix is softened by edema incidental to impaction in the pelvis, but there is rarely enough softening to imitate pregnancy.

14. Tenderness of uterus. Not tender on palpation or movement, except when complicated.

15. Mobility of uterus. Movable in pelvis with tumor, unless tumor is so large as to fill pelvis or so situated as to put uterine supports on stretch, or complicated by pelvic inflammation or another tumor. Uterus and tumor movable together, but not separately unless tumor is pediculated.

16. Discharge from uterus. Usually there is a discharge, due to complicating endometritis (simple or infected).

17. Discoloration of cervix or vagina. None, except what can be accounted for by evident pressure on vessels.

18. Relation of mass to tube and ovary. No connection with tube or ovary, except possibly lying against them. Tube and ovary of each side may be felt (if abdominal wall not too tense), unless mass is so large or so situated as to obscure them.

19. Relation to pelvic wall. No connection with pelvic wall, except when large enough to extend to it or when complicated by inflammation or another tumor.

20. Relation to vaginal wall. Depends on situation of tumor, usually well above wall. When in cervix, the mass lies against vaginal wall, just beneath examining finger.

21. Bladder. May be compressed by mass and distorted, or may be pulled up into abdomen (Fig. 615).

22. Rectum. May be pressed upon to such an extent as to cause hemorrhoids.

23. Mass elsewhere. In addition to the main tumor springing from the uterus, one or more other nodules may usually be felt in some other part of the uterus.

24. Colon or small intestine in front. Not unless retroperitoneal or complicated by adhesions.

25. Outline of dullness. Dullness over mass and resonance elsewhere, unless complicated by ascites.

26. Shifting outline of dullness. No change in outline of dullness on change of position of patient, except when complicated by ascites or when tumor rolls some in the abdomen.

27. Hard masses within a cystic mass. Nothing like this, simulating fetal parts in the uterus, except rarely when complicated by ascites. One case is recorded in which this condition was present and even ballotement could be secured (Fig. 429).

28. Pulsation of mass. No pulsation felt, unless tumor lies over aorta. To differentiate between this pulsation and that of aneurysm of aorta, palpate well down to the sides of the mass to see if there is expanding or lateral pulsation.

29. Fetal movements. None felt. In a large smooth tumor, suspicious of pregnancy near term, dip the hands in cold water and then palpate the abdomen, watching for fetal movements.

30. Vascular murmur. May or may not be murmur in region of large vessels.

31. Fetal heart sounds. None heard. Fetal heart sounds are often not heard in full-term pregnancy, consequently not much value attaches to their absence in excluding pregnancy.

32. Fever. No fever unless there are complications in the pelvis or elsewhere.

33. Emaciation or fat deposition. There may be either or neither. If much hemorrhage, usually anemia and some emaciation.

34. Breast disturbance. None ordinarily, though occasionally there is some tenderness.

35. Evidence of disease elsewhere. None, unless complicated.

The usual symptoms with the history and general course have already been given.

In a doubtful case it may be necessary to run over the other Points (36 to 63) in the Diagnostic Table (page 288).

When making the diagnosis of fibromyoma of the uterus, the following conditions and questions must be considered:

A. OTHER DISEASES PRESENTING A MASS OR INDURATION, which may be mistaken for a fibroid. The more common of these diseases are salpingitis with exudate, pelvic cellulitis, hydrosalpinx, pregnancy, extrauterine pregnancy, pelvic tuberculosis, ovarian or parovarian tumor, cancer of the uterus.

B. DISEASES OF THE UTERUS WITHOUT A MASS OR INDURATION, which may be mistaken for fibroid. For example, retrodisplaced uterus with chronic endometritis, chronic endometritis with subinvolution, carcinoma of corpus uteri, tuberculosis of uterus, prolapse of uterus, inversion of uterus.

C. FIBROID WITH COMPLICATIONS. In a case presenting anomalous symptoms, the condition may be a fibroid complicated with pregnancy or extrauterine pregnancy or salpingitis or ovarian tumor or broad-ligament tumor or malignant disease of the uterus.

D. ADDITIONAL QUESTIONS. After it has been established that a uterine fibromyoma is present, the following points are to be considered:

1. Does the fibroid tumor cause all the symptoms? If not, what symptoms are caused by it? What causes the other symptoms?
2. What is the relation of the tumor or tumors to the uterine wall and cavity?
3. What is the relation of the tumor or tumors to the other pelvic organs and to the pelvic wall and to the peritoneum?
4. What complications are present—particularly pregnancy, malignant disease, pelvic inflammation, heart disease, kidney disease?

5. What has been the progress of the disease in this case, and what will probably be the further progress?

TREATMENT.

In regard to treatment there are three propositions to be considered: (A) no treatment, (B) palliative treatment and (C) curative treatment.

A. NO TREATMENT.

A certain small percentage of fibromyomata are discovered by accident, i e., during a pelvic examination for symptoms not due to the fibroid. The fibroid is small, has caused no symptoms, is not likely to cause symptoms soon, and is not likely to aggravate the symptoms due to the other trouble.

Such a tumor requires no treatment, and it is just as well, as a rule, that the patient be not informed of its presence. She should, however, be kept under observation, to see if there is any increase in the growth. Explain the condition to the husband or other responsible relative, that your skill be not called in question should the patient be examined by some other physician and the presence of a tumor announced.

There is one class of small fibroids, that I feel constitutes an exception to this rule of "no symptoms, no treatment," namely, cervix fibroids. When situated in the lower part of the uterus, a fibroid of any considerable size is a dangerous affair in the child-bearing period. If pregnancy should take place, the tumor will probably increase in size and may become a serious menace to labor at term. Again, a cervix fibroid is likely to cause symptoms (bladder, rectal or menstrual) at any time, even though small. Such a tumor in a married woman should be removed. If not complicated by tumors elsewhere in the uterus, it may be approached from the vagina and removed by a comparatively simple operation.

B. PALLIATIVE TREATMENT.

Palliative treatment is symptomatic. It is directed towards relieving the disturbances occasioned by the fibroid and making the patient more comfortable. The principal disturbances requiring the palliative treatment are the bleeding and the pressure symptoms.

Measures for Palliative Treatment.

The palliative measures are (1) tonic measures, (2) uterine astringents, (3) vaginal packings, (4) intrauterine treatment, (5) ligation of uterine arteries, and (6) removal of ovaries with ligation of ovarian arteries.

1. General tonic and hygienic measures. The better the patient's general health, the less the annoyance from the fibromyoma. Consequently there should be employed laxatives (as in pelvic inflammation), tonic medicines, avoidance of long walks, rest at the menstrual periods, douches as indicated by discharge, and a general regime to improve the general health and diminish pelvic congestion.

2. Uterine astringents. These are hemostatic remedies, administered for the purpose of diminishing the bleeding (menorrhagia and metrorrhagia). The hemostatic remedies thus used are ergotin, stypticin, hydrastinin, adrenalin (preferable to thyroid extract or mammary extract) and calcium chloride (see Formulæ).

Ergotin is the one that has been most extensively used, It is an exceedingly useful remedy for temporarily lessening the memorrhagia. Continued for several months in one grain to two grain doses it produces marked improvement in certain cases. Other tonics may be combined with the ergotin (see ergotin and nux vomica capsule—Formulæ) and if there is much pain it is well to combine also a sedative such as cannabis Indica (see Formulæ).

Byford cites a series of 101 fibroid cases treated by ergot. Twenty were reported cured. In 39 others the tumor was reduced in size and the symptoms relieved. In 19 others the hemorrhage diminished but the tumor remained the same size. In 21 there was no effect. Nelson collected 153 cases treated by ergot, of which 11 died. Even in cases where operation is necessary, ergot (preferably in the form of ergotin) is a useful palliative measure while the patient is waiting.

3. **Vaginal treatment.** Antiseptic vaginal douches are required in cases presenting leucorrhoea or bloody discharge. Vaginal packing may be needed to check bleeding temporarily or to raise an impacted tumor out of the pelvis. A firm vaginal packing of antiseptic gauze, or of cotton (made antiseptic by iodoform and tannic acid equal parts, dusted in freely) is an excellent measure for temporary control of bleeding from within the uterus. The patient is kept quiet in bed and the packing changed every two or three days as necessary to prevent decomposition. This may be used in conjunction with uterine astringents, to control bleeding temporarily, while the patient is being built up for operation or is being taken to a place for operation. When the bleeding can be thus controlled, the dangers of intra-uterine disturbance (packing, instrumentation) are thus avoided.

4. **Intra-uterine measures.** The intra-uterine measures for the control of the hemorrhage are (a) electricity, (b) curetment and (c) applications and packing.

a. ELECTRICITY. In certain cases of small interstitial or submucous growths, this is a useful palliative measure. The details of the application of electricity for uterine bleeding are given in chapter III (page 356).

The use of heavy currents, running up to 200 and 250 m. a. (Apostoli method), with or without puncture, is not advisable. It is too hazardous for the uncertainty of result. It may cause serious necrobiotic or inflammatory changes, which add very much to the danger of the subsequent operation, and it has even caused death. It is not to be recommended except in urgent conditions where the patient can not undergo operation for the removal of the growth. Some still cling to it as a curative measure. Massey, of Philadelphia, in reporting 86 cases subjected to this treatment, stated that 64 resulted in "practical success" (symptomatic cure) and of these the tumor was "extruded through the cervix in whole or in part or in 4, disappeared by absorption in 12, and was reduced in size in 3%." Hirst, of Philadelphia, who was one of a committee of three appointed by the Philadelphia County Medical Society to investigate this treatment, states that "in three years' time not a single case was presented to us of a tumor reduced in size by electrical treatment."

Even the use of the milder currents, as first mentioned above, presents the usual dangers of intra-uterine instrumentation and is, as a rule, advisable only in nonoperable cases, or in operable cases only to control otherwise uncontrolable bleeding until the patient can be gotten in condition for operation.

b. CURETMENT. This may control bleeding temporarily in those cases in which the bleeding is due to hyperplasia of the endometrium. In many cases, however, the cavity is so distorted that the curet can only wound parts of the wall here and there without removing the entire endometrium. In addition to this uncertainty of controlling the hemorrhage, there is danger of infection of the uterine wall or infection and necrosis of the growth, leading to an exceedingly dangerous condition. Schroeder reports a case of necrosis of a submucous tumor, the capsule of which had been torn by the curet.

In carefully selected cases, curetment may be advisable, partially as a diagnostic measure, but there must be a clear understanding of the dangers incident to it and good reason for taking the risk. In the hands of those experienced in the selection of cases and in the use of the curet, the probability of any serious complication from a clean curetment is not great. But there is great risk in careless intra-uterine instrumentation in these cases, even the simple introduction of the uterine sound (see Figs. 610, 611).

c. INTRA-UTERINE APPLICATIONS. These are dangerous and inefficient. In inoperalbe cases the judicious use of the curet or of electricity is preferable. Occasionally, as an emergency measure for the immediate control of alarming hemorrhage, intra-uterine packing may be used. But usually a firm vaginal packing will secure the same results without the dangers incident to intra-uterine instrumentation.

5. Ligation of the uterine arteries to diminish the blood supply to the growth and check bleeding. There has been considerable dispute as to who is entitled to the claim of priority in originating vaginal ligation of the uterine arteries for this disease. My friend, Dr. W. B. Dorsett, of this city, suggested it in 1890 in an article entitled "A Case of Atrophy of the Female Genitalia Following Pregnancy, and Remarks." Gottschalk, in an article published in 1892, remarked that ligation of the uterine arteries might be a useful measure and stated that he had performed the operation in two cases. Franklin H. Martin suggested vaginal ligation of the base of the broad ligaments in 1893, and in 1894 reported six cases treated by this method. Several series of cases have since been reported. The operation proves disappointing in a large proportion of the cases.

Since the perfection of myomectomy and hysterectomy, this uncertain method is applicable only in exceptional cases. It is useful in certain patients who are in too bad a condition for operation for removal of the tumor. Also, it may be tried in patients who refuse radical methods and prefer to submit to the smaller and less serious operation. Only interstitial growths are suitable for it, and the operation should be conducted so as to ligate practically all the main vessels supplying the region of the growth. In cases where the vessels in the upper part of the broad ligaments can be reached from below, they also should be ligated.

6. Removal of the ovaries, with ligation of the ovarian arteries. This operation cuts off the blood supply through the upper part of each broad ligament and also stops the recurring menstrual congestion. There is frequently considerable difficulty in reaching the adnexa and vessels, because the tumor-mass is in the way or because of complicating adhesions from tubal inflammation, so there is more danger attached to it than one might at first thought suppose. In a reported series of 29 cases there were three deaths. In another reported series of 262 cases the mortality was 1.5%.

Cullingworth had 25 cases without a death. He mentions also that in three cases in which the operation was attempted, one or both appendages could not be recognized and their removal had to be abandoned.

In Martin's 65 cases, menstruation continued indefinitely after operation in a considerable proportion of them, and in 6% subsequent hysterectomy was necessary. This operation, also, is limited to comparatively small interstitial tumors. In these it will diminish the hemorrhage and reduce the size of the growth in proably more than half. In 10 to 15 % of the cases, continued hemorrhage or continued growth of the tumor or some serious degeneration of the same, necessitates later radical operation. As an operation of choice, it is not to be compared to removal of the growth, but as an operation of necessity, it may do much good. For example, when the abdomen has been opened and the tumor found of such character or with such complications that its removal is not advisable, or when the patient suddenly passes into such serious condition during operation that the contemplated radical operation cannot be proceded with, then the ovarian vessels and other vessels within easy reach may be quickly ligated and the ovaries removed and the abdomen closed.

Of course, every particle of ovarian tissue must be removed if the cessation of menstruation is to be secured,though the simple ligation of the principal vessels supplying the tumor may make some improvement. The enlargement of the blood vessels in the vicinity of the tumor, adds materially to the danger of the operation. Fatal hemorrhage has occured from the puncture of a dilated vessel by the pedicle needle.

Indications for palliative treatment.

Palliative treatment is required in the following classes of cases:

1. When the symptoms are slight and transitory. In some of these cases the judicious employment of pallative measures No. 1 and No. 2, will relieve the pelvic disturbance so much that the patient is symptomatically a well woman.

2. When the patient is not in condition for operation, because of some temporary trouble. In some cases the patient is so anemic that to subject her to a major operation would be a most serious menace, hence the necessity of preparatory treatment. It may be necessary to employ palliative measures for several weeks before the operation. The percentage of hemoglobin should be brought up to at least 50% if possible, and the red blood corpuscles to 3,000,000.

3. When the patient is debarred from operation by some permanent trouble In these cases, the palliative measures must be employed indefinitely.

4. When the patient refuses operation. Some patients prefer to get along as best they can, rather than undergo a serious operation. In all of these cases, much relief can be given by palliative measures judiciously employed, and some may be kept in comparative comfort indefinitely.

C. CURATIVE TREATMENT.

The only reliable curative treatment for uterine fibromyomata is removal by operation.

Operative measures.

The various operative measures looking to the removal of the growth are as follows:

Myomectomy—Removal of the tumor or tumors and preservation of the uterus.

ABDOMINAL MYOMECTOMY—Enucleation from the outer surface of the uterus.

VAGINAL MYOMECTOMY—Enucleation from the outer surface of the uterus (cervix) or from the inner surface (by splitting the uterus).

Supravaginal Hysterectomy—Removal of the tumor and of the body of the uterus, leaving the cervix. This is, of course, carried out through the abdomen and is the form of operation usually referred to as "abdominal hysterectomy for fibroid" and "abdominal hystero-myomectomy."

Total Hysterectomy—Removal of the tumor and of the entire uterus, including the cervix. This is carried out through the abdomen or through the vagina, as thought best in the particular case. In certain exceptional cases it is preferable to carry out the operation as a combined vaginal and abdominal hysterectomy.

Each of the operative measures given above has its advantages and disadvantages in various classes of cases. While there is not space here for a general discussion of this subject, I think it advisable to call attention to certain precautions that should be taken in order to avoid cancer of the cervical stump after supravaginal hysterectomy.

The physiological and technical advantages of leaving the cervix are beyond question. The stubborn fact, that will not down and that stands as a spectre imperatively demanding a close study of the question is this: that in a number of cases, treated by supravaginal hysterectomy, the patient has later died of malignant disease of the cervix. It is easy to say "for that reason we should remove the cervix in all cases." That would be an easy solution of the problem as far as the operator is concerned, but I do not believe it is the best from the standpoint of results to the patients. The mortality would be higher and the morbidity would be higher—all for the purpose of attaining a security which I am satisfied can be obtained in a way that is decidedly safer, though somewhat more troublesome.

That way, is to observe the following precautions before and during and after operation:

BEFORE OPERATION.

1. Examine carefully to exclude malignant disease of the cervix or corpus uteri, in suspicious cases making a microscopic examination of clippings. If malignant

disease is found, of course, total hysterectomy with wide removal of the parametrium is indicated.

2. Ascertain if the cervix is severely lacerated or the seat of chronic irritation from any cause. If so, employ total hysterectomy.

3. If there has been recent infection in the uterine cavity or adjacent tissues, with the development of a condition making immediate operation necessary, employ total hysterectomy.

4. In some cases total hysterectomy is required because of the situation of the tumor.

In all other cases requiring removal of the uterus, supravaginal hysterectomy is the preferable operation.

DURING OPERATION.

5. As soon as the tumor is removed, have a responsible assistant open it and make a rapid and critical examination of the tumor and uterus. If anything suggesting malignant change is found, remove the cervix.

AFTER OPERATION.

6. After operation submit all specimens to a microscopic examination, of sufficient thoroughness to determine the presence or absence of malignant infiltration. If malignant change is found, promptly remove the cervical stump. This can be readily removed per vaginam.

By these measures, supravaginal hysterectomy is limited to cases in which the cervix is practically normal and in which the chance of development of malignant disease is so slight as not to constitute a practical contra-indication to preservation of the cervix.

Indications for Operation.

In what cases is removal of the growth advisable? As a general proposition it may be stated that the growth should be removed when there are troublesome symptoms which persist after the employment of palliative measures No. 1 and No. 2, or in which the conditions are such that those measures are not likely to give relief. In a considerable proportion of the cases the symptoms are so severe and threatening that there is no question as to the advisability and urgency of operation for removal.

In the majority of cases, however, the symptoms are not so severe nor threatening, and by palliative measures the patient may be made fairly comfortable for a time. In such cases should the tumor be removed or should it be left alone until serious symptoms develop? This is one of the most important problems now before gynecologists for solution. The facts so far available indicate that in those cases with persistent symptoms, the interests of the patient are best conserved by the removal of the growth while the patient is still in good condition and the risk accordingly small. If further experience confirms this, it will mark one of the most important advances in surgery—ranking with the establishment of the interval-operation in appendicitis.

To present this important subject clearly, I give the following quotation from a paper which I read before the Missouri State Medical Association in May, 1906.*

"In order to come quickly to the point I will eliminate at once those classes of cases about which there is practically no question.

1. Cases in which the tumor causes no symptoms. These are seen by the physician only rarely and then usually by accident.

2. Cases in which the tumor is small and is causing only slight symptoms(moderate menorrhagia or dysmenorrhoea) which are relieved by general tonic treatment with the addition of uterine astringents (ergotin, stypticin, hydrastis), and the symptoms do not return soon after the treatment has been discontinued.

3. Cases in which the patient is past 45 years of age and the tumor is stationary in size, not large enough to cause disturbing pressure symptoms, accompanied by only moderate menorrhagia and without troublesome intermenstrual symptoms.

"It will hardly be questioned that for these three classes the expectant plan is the preferable treatment.

4. Cases presenting conditions that threaten life or cause persistent severe suffering. The necessity of operation in this class has long been generally recognized.

"It is the cases which lie between these two extremes to which I wish to direct your attention. What is the best treatment for the patients who have no threatening symptoms? They come for advice and treatment and the question is, what is best to do for them?

"The tumor is of moderate size, perhaps as large as the fist or two or three times as large. The patient is fairly well nourished, probably somewhat anemic, but not seriously so. The menstrual flow is excessive but by the continuous administration of ergotin or stypticin it can be held down to very moderate menorrhagia. The backache and pelvic pressure are very troublesome at the menstrual periods but between periods the patient feels fairly well and is able to do her work and attend to her social duties. She feels dragged out a good part of the time and has backache and pelvic discomfort after extra exertion. The patient is a semi-invalid—not sick enough to be called sick and not well enough to be called well.

"She is between 30 and 40 years of age and has been under treatment, including a general tonic regime with the addition of uterine astringents, long enough to make it plain that the condition described is the best that can be obtained short of operation.

"What advice shall we give such a patient? Should the tumor be let alone or should it be removed?

"It is easy to say to the patient: 'Wait. There is no special indication for operation just now, there may be no serious increase in the symptoms at any time, and it is possible that after the menopause the troublesome symptoms will largely disappear.'

"The points made in that advice are all literally true and the advice itself seems plausible. But when some complication that would have been prevented by early removal of the tumor, rapidly causes the death of our patient or forces her to operation with quadrupled risk, we begin to doubt the wisdom of the waiting advice. This is not a picture of fancy. Nearly all the fibromyoma cases that were operated on the world over previous to the last two or three years, and the larger part of those that are operated on today, have passed through the process just mentioned.

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* **Some Questions Concerning the Treatment of Uterine Fibromyomata, by H. S. Crossen, M. D. Journal of Missouri State Medical Association, Vol. III, No. 3, 1906.**

" The patient went to a physician who treated her expectantly, according to the established usage, and congratulated himself that she was getting along pretty well. And she was "getting along pretty well"—"pretty well" toward a condition that greatly increased the risk of the operation which was finally necessary.

"I may speak plainly for I speak from experience. The cap fits and I put it on—I trust others will do the same.

"In many cases the physician who long treated the patient loses the lesson of the case through no fault of his own. Some of these patients pass through many hands in the various stages of the tumor's growth, for it extends through many years. Perhaps half a dozen physicians have, from the same case, been established in their conclusion that fibroid patients get along very well and rarely need operation, while only the last physician whom the patient consults has the true lesson of the case forced upon him in a way that cannot be misunderstood. In some cases the serious condition advances so rapidly or so insidiously that the patient dies without the consideration of operative measures, or is found in such condition that operation is no longer possible.

"Some physicians find it hard to believe that uterine fibroids really cause death except so rarely that the cases may be classed as curiosities. A practical experience with even a moderate number of advanced cases will quickly dispel this illusion, provided the physician watches the cases to their terminations. Bishop reports 27 deaths due to fibroids without operation.

" On the other hand, in deciding what to do for these patients, it is easy to take the other short-cut and advise all patients with palpable fibroids to be operated on—that is, it is easy for the physician. But before advising operation in any case we must assure ourselves that the chance of death assumed is fully justified by the danger of delay in that particular case. Then, if death comes in spite of every precaution, we know at least that it was not an unwarranted sacrifice. It is easy enough to advise operation, but it is not so easy to restore life to the deceased—who, but for the operation, might have lived in comparative comfort to old age.

"But what advice shall we give our patient? The symptoms at present are not such, in themselves, as to necessitate operation. They are not threatening speedy death, neither are they causing great disability. If they continue as they are, the patient, by continuing under treatment, by lying down most of the menstrual days and by being careful at other times as to extra work and walking, may live a fairly comfortable life.

"Many women, probably most women in ordinary circumstances, would prefer this state rather than seek complete health through a dangerous operation, even though the operative mortality is small. And I am not going to condemn such a choice—in fact, granted the stationary char- [illegible] rouble, I would strongly advise such a course.

"But have we any well-grounded assurance that the trouble will remain stationary? There lies the gist of the matter.

"The patient comes to the physician to learn, not what she already knows, viz., that with the present symptoms she can get along in comparative comfort, but she comes to learn whether or not it is safe for her to go along in that way. She wants to know whether she had better have the tumor removed now, while she is in good condition and the risk accordingly small, or whether she had better wait and see whether or not severe symptoms develop.

"This brings us up squarely to the question of prognosis in this class of myoma cases.

"It is interesting, and pertinent to the subject, to notice for a moment the method of development of surgical treatment in general and of abdomino-pelvic surgery in particular.

"At first major surgery was invoked in only the most desperate cases, those that were passing to certain and speedy death. This was proper for, in the state of experience at that time, the operation itself meant death in many cases. It was a desperate remedy for a desperate condition, and occasionally attained success. As the technique was perfected, more of the desperate cases were rescued from death. As these fatal conditions for which operation was carried out, were studied in conjunction with the experience gained in the operative work, physicians began to anticipate the desperate and terminal conditions, and to operate when the patient was in a somewhat better condition—and with much better success.

"Then they began to look still further ahead and consider the possibilities of surgery in conditions that became inoperable many months before death. Thus was gradually worked the prognosis and required treatment for ovarian tumors, for uterine cancer and for other pelvic and abdominal diseases that were found to prove invariably fatal within a few years. The necessity of early operation in these conditions that proved fatal in a comparatively short time, was soon established, and gained general acceptance long ago. The course of such diseases was quickly run. Within the short period of a few years, the physician saw the patient a well woman, then the disease beginning, then its full development and then the invariable death, this series of events taking place so quickly that it was all under the one physician and within his recent recollection. The lesson was obvious—delay meant death.

"That field conquered, surgical attention was directed to the question of early operation in those diseases which, though not invariably causing death, nevertheless frequently caused death and in another large proportion of the cases caused persistent suffering and invalidism. Then was worked out the advisability of operation in the quiescent period (before the onset of the threatening or terminal symptoms) in cases of persistent salpingitis, appendicitis, nephrolithiasis, cholelithiasis, and many other abdominal and pelvic conditions that run a comparatively rapid course. In the case of a patient with one of the diseases, the prognosis is not necessarily fatal. Many such patients having persistent symptoms have lived to old age. And yet when any one of these conditions is unmistakably present, and there are persistent symptoms from it, there is little question but that removal of the disease is the part of wisdom, not so much because the present symptoms are troublesome but because the symptoms indicate that the process is continuing active—it having been established, and generally accepted, that when any one of these diseases is persistently active, it is liable at any time to develop a condition that may cause the patient's death or make more hazardous the operation then necessary to save her from death.

"This is exactly the condition that is present in uterine fibromyoma with persistent symptoms, even though the symptoms are not for the present threatening or disabling. Yet this fact is not generally recognized, and there is good reason for its not being recognized. Physicians generally have the excellent habit of requiring proof before accepting a statement, and the absolute proof as to the advisability of early operation in uterine fibromyoma has not been forthcoming. I say this with all due respect to the many excellent men who have expressed as many excellent variations of the opinion that early operation is advisable. Opinion is not proof. It usually precedes proof and stirs up and brings out proof. When the proof is produced, however, it is sometimes found that the opinion which preceded it, proceeded in the wrong direction. So I am not surprised that the profession waits to see the proof, before accepting the statement that early operation should be the rule in these cases.

"When we come to produce the proof we find that we haven't it—at least, if any one has it I have not seen it, and I have spent a good deal of time looking for it in the last few years.

"Facts are gradually being accumulated, and many bearing on various phases of the subject have already been presented to the profession, but the actual life-history of fibromyoma patients, of the class under consideration, has not been followed up and completely recorded in a sufficient number of cases to enable us to present positive proof as to what proportion of them die of the disease, what proportion suffer chronic invalidism, and what proportion experience no serious trouble.

"The finding of fatal complications in a large proportion of the operated cases is not proof positive that the less severe cases should be subjected to operation, any more than the finding of perforation or abscess formation in a large proportion of the severe operated cases of appendicitis was proof positive that it was wise to subject the less severe cases to operation.

"The principal question concerning these fatal complications is not 'What proportion of operated cases present them?' but **'What proportion of the mild cases progress to them?'**

"I do not minimize the importance of the arduous work of determining accurately the number of these complications in operated cases. That is needed and is necessary to the determination of the proportion of serious results in all clincial fibroid cases.

"But in our enthusiasm over the accomplishment of the first, we must not mistake it for the second. The proportion of operated cases presenting these fatal and disabling complications is now a matter of record, and the record includes a sufficiently large number of cases to justify fairly definite conclusions on that point. The proportion of mild cases that progress to the serious condition is not a matter of record, in fact, has not been even approximately determined, and cannot be until the life-history of a very large series of the various classes of fibromyoma cases, is available for analysis.

"This can be secured only by following the patients of each class through many years to the end. No doubt this matter has been taken up to some extent and will be taken up very generally and prosecuted till a sufficiently large series has been secured. I hope to accumulate some information on this point, at least for my own satisfaction, but it is uphill work. The patients move and are lost sight of. There is not the same mutual interest that attaches in operated cases, and the patients are followed with greater difficulty and fewer returns. But this life-history of the less severe cases CAN be obtained in time and MUST be obtained, for it is necessary to complete knowledge of the subject.

"Some of us have had an experience in these cases sufficiently large to justify us in forming and expressing an opinion to assist in the guidance of others. And though we may believe that our views are sound and founded on the facts as far as they go, and will become more generally recognized as more and more facts are established, yet we must not forget that the complete proofs, in black and white, are lacking at the present time.

"Why is it so hard to establish certainly the exact proportion of fibromyoma cases that turn out badly? Because of the slow progress and long duration of the disease. In persistent salpingitis or appendicitis the cases that are going to turn out badly usually do so within one or two or three years, so by watching a large series of cases for that length of time it could be determined what proportion resulted seriously, and could be established by statistical proof just what proportion of cases could be saved from death or disablement by early operation. The fibromyoma cases, on the other hand, present a much more difficult problem. Here the absence of threatening symptoms for five or ten or twenty years, gives no assurance that serious trouble may not develop at any time. Case histories are numerous showing that patients have waited patiently and hopefully for ten or twenty years, with fibroids that produced no serious symptoms, only to come at last to the operating table because of some rapidly developing trouble dependent on the tumor. Consequently each patient must be followed to the end before we can say that there was no occasion for removal of the growth in that case.

"But we cannot wait until all these things are determined before giving our patient advice.

"What are the facts so far established, that will help to guide us in advising this patient?

"1. Some fibromyomata never give serious trouble. I refer of course to clinical fibromyomata, i. e., tumors that were recognized during life or that could have been recognized had the patient come for examination. The small latent fibroid nodules, found in such a large proportion of sectioned uteri removed post-mortem, are not now under consideration.

"A patient may go through a long and useful and happy life with a palpable fibroid, and experience no particular difficulty from the growth. This fact has been demonstrated over and over again in clinical work and in autopsies on patients who have died of independent diseases or of senility.

"What proportion of cases run this course we do not know either exactly or approximately. We know only that "some"—a considerable number—have done so. This fact, however, is sufficient to overthrow the contention that "all palpable fibroids should be subjected to operation." There is a mortality due to the operation. To be sure the mortality is small, under proper technique and surroundings, and will become much smaller as the cases are subjected to operation earlier and therefore under safer conditions. But even in the most favorable cases there is, and will continue to be, an occasional death from the operation. And before advising operation in any case we should, as already remarked, assure ourselves that the chance of death assumed is fully justified by the danger of delay in that particular case.

"2. In a certain proportion of cases there have developed fatal complications, which were due to the tumor or would have been prevented by its early removal.

"Just what proportion of all clinical fibroid cases have developed, or will develop, these fatal complications we do not know, and cannot know in the present state of knowledge.

"Just what proportion of OPERATED fibroid cases have developed these complications has been determined in several series of cases, through the careful observation and painstaking labor of the physicians under whose care the patients came. No one can investigate this subject without coming to feel under personal obligation to the men who have taken the time and the labor to prosecute this work in a reliable way and to place the results before the profession. To Dr. Chas. P. Noble, of Philadelphia, belongs the credit of stirring up the profession on this subject, by presenting and keeping before it incontestible evidence, from his own work and the work of others, of the great frequency of fatal and disabling complications, due directly to these tumors or associated with them.

"In a series of 1,188 cases collected by Noble (Noble 278, Scharlieb 100, McDonald 280, Martin 205, Cullingworth 100, Frederick 215, Hunner 100), there were found the striking number of 795 complications.

"However, in looking over this list it is seen that many of the complications are not serious and, of even the serious ones, some are in no way dependent on the presence of the tumor.

"In order to determine approximately what probable fatalities, here noted, could have been prevented by early removal of the growth, I prepared the tabular analysis given below.

"The number of tubal and ovarian complications prevented by early removal of the growth depends, of course, on the number of tubes and ovaries removed. I made the estimate on the basis of two-thirds of the tubes removed (hysterectomy in two-thirds of the cases and myomectomy in one-third) and half of the ovaries removed (both ovaries removed in one-third of the cases and one ovary removed in another third). Of course, if found advisable to limit myomectomy to a smaller proportion of the cases, more tubes would be removed and hence more tubal complications prevented.

"As to whether myomectomy is preferable to hysterectomy in a considerable proportion of the cases, that is a question concerning which there is much of interest to be said on both sides and it can not be taken up here. However, there is no question but that, as early operation is more widely adopted, a larger proportion of the cases will be found suitable for myome
In fact, the more frequent saving of the uterus is one of the benefits that will follow
tion of early operation in these cases. The chance of later enlargement of small " la

nodules to the dignity of clinical fibroids, is not so great as to deter us in preserving the uterus in suitable cases. Such growth takes place occasionally. Some months ago I was obliged to remove the uterus for extensive multi-nodular intra-ligamentary fibroid development in a patient, aged 31, who eighteen months previously had undergone myomectomy in a New York hospital. In this particular case I attribute the rapid growth of the fibroids partly to the chronic congestion of a severe pelvic inflammation, resulting in pyosalpinx, the infection evidently having been contracted some time after the first operation. Ordinarily, according to the reported cases that have so far come to my notice, this development of other tumors after operation has not taken place often enough to constitute a serious objection to myomectomy in suitable cases. Again, in certain cases, the preservation of the uterus is well worth the risk of a second or even a third operation.

"In estimating the number of serious tubal and ovarian complications prevented by early removal of the tumor, the bare proportion of tubes and ovaries removed does not fully represent the proportion of complications prevented, for only apparently normal adnexa are left. Those tubes and ovaries which would show serious trouble later, are likely to show some abnormality at the time of operation and hence would be removed.

"The table includes 1,815 cases, consisting of nine series of consecutive cases (Noble 1,118, as mentioned above, Watt-Keen (from Hofmeier's clinic) 417, Webster 210). The question is: 'What probable fatalities, from degeneration of the tumor or from local complications, would have been prevented by early removal of the tumor?,' and only the complications bearing on this question are mentioned. In the first column (A) is given the number found of the particular degeneration mentioned. In the second colum (B) is given the number of these that would almost certainly have been prevented by the early removal of the tumor. And in the third column (C) is given the probable fatalities from the latter.

"Number of cases, 1815.	A	B	C
Necrosis of tumor	86	86	80
Suppurating tumor	10	10	8
Oedematous tumor	11	11	4
Myxomatous degeneration of tumor	56	56	40
Cystic degeneration of tumor	53	53	30
Calcareous degeneration of tumor	36	36	6
Serious intra-lig. development of tumor	44	44	15
Malignant disease of tumor or of corpus uteri	65	65	65
Large hydronephrosis from tumor pressure	6	6	3
Twisted pedicle of tumor	33	3	2
Pyosalpinx	37	24	15
Salpingitis	127	84	12
Abscess of ovary	10	5	3
Carcinoma of ovary	3	2	2
Ovarian (cyst) including dermoids	118	75	60
Probable Fatalities			345

"This shows probable fatalities numbering 345, or 19 per cent, simply from the tumor degenerations and local complications mentioned, exclusive of other fatal and disabling effects of the fibroid. This I consider an ultra-conservative estmate. I believe that, were these cases traced to the end without operation, the number of death [illegible] onditions specified would considerably exceed the num-

"In a recent report by Winter of 753 operated cases, malignant disease of the tumor or corpus uteri was found in 39 cases and total necrosis of the tumor in 17 cases. Thus, counting only two of the serious conditions mentioned in the table, it is found that they include nearly 8 per cent of his cases.

[In an article by Noble since published, in which he analyzed a series of 2,274 cases, it was estimated that 23 per cent of the patients would have died, from degenerations or complications existing in the uterus or in the appendages or in the abdomen. In his study of a series of 4,480 cases in respect to carcinoma, he found carcinoma was present in 2.8% (in corpus uteri 1.5%, in cervix 1.29%). In a careful examination of his own 337 consecutive cases, however, he found carcinoma in 4%. As to sarcoma, Winter, in 500 cases in which grossly suspicious areas only were examined microscopically, found sarcoma in 3.2%, but in 253 cases sectioned systematically, sarcoma was found in 4.3%. It is probable then, that if all tumors operated on late were subjected to systematic microscopic examination, malignant disease (sarcoma or carcinoma) would be found in 8%.]

"3. In a certain proportion of cases, serious visceral degenerations appear in distant organs. The frequent association of heart disturbance with advanced uterine fibroid, has attracted much attention. The proportion of cases showing heart disturbance is striking. Winter had 266 consecutive cases examined for heart diseases and found heart disturbance in forty per cent. In five series carefully examined (Winter 266, Strassmann and Lehmann 71, Boldt 79, Fleck 325, Webster 210), the number showing heart disturbance varied from 25 to 47 per cent., averaging 38 per cent. for the whole 951 cases. Of course, a certain number of these heart disturbances would have been found in any series of patients. But making due allowance for these the number is too marked and constant to be a mere coincidence. The exact connection between the two has not been worked out. But whether the heart disturbances are due principally to the chronic anemia from hemorrhage or to the direct action of some toxin manufactured in the fibroid, or constitute simply an associated product of the same conditions that produced the fibroid—whatever the cause—the fact remains that they are there and must be reckoned with. Some of these are minor functional disturbances but on the other hand many are of serious import.

"That such is the case is shown by Baldy from the records of the Gynecian Hospital. In the series of 3,413 operations, sudden post-operative death due to circulatory disturbance occurred 16 times. Thirteen of these sudden deaths occurred in the 366 fibromyoma cases, while the 3,047 other operative cases furnished only 3 such deaths. It occurred 36 times as frequently in the fibroid cases as in the general run of operative cases.

"Other visceral degenerations from the chronic anemia, from pressure on the ureters and from other effects of the fibroid, produce fatalities due really to the fibroid, but attributed to other cases.

"Let us now look at some of the facts that are put forward against the idea that myoma causes death in any considerable proportion of the cases.

"1. General mortuary records show only an insignificant death rate from this disease.

"The U. S. Census (1900) shows 657 deaths from fibroid tumor of the uterus in a population of about 37,000,000 females.

"The Great Britain Census (1901) shows 339 deaths from fibroid tumor of the uterus in a population of about 17,000,000 females. There is a striking agreement here, both indicating that the death rate is about 1 in 50,000—a very soothing proposition to one called to treat a patient so afflicted. But was this all the deaths from fibroid disease in that time? Do not the numbers here given represent simply the cases in which nothing else could be found to account for the death. How about the fibromyoma patients that died of kidney disease, of heart disease, of anemia, of "uterine hemorrhage," of uterine "cancer" (cancer of the endometrium associated with fibroid or a sloughing fibroid mistaken for cancer), of salpingitis, of peritonitis, and of other conditions due directly to the fibroid of that would have been prevented by its early removal? Until we count the deaths due to these complications, the census figures amount to very little as showing the deaths due to fibroid disease. They show simply that, in the countries mentioned, few patients die of *uncomplicated* fibroids.

"2. Hospital records of fibroid cases show few deaths among them. In St. Bartholomew's Hospital, among 547 uterine fibromyoma cases there were but 29 deaths, and 28 of these followed operation. Here is a series of 547 fibroid cases only one of which died of the fibroid while 28 died of the operation—accurate records, careful diagnosis, thoroughly reliable report. What shall be said to that?

"Before deciding as to the practical significance of these figures I would seek some additional information. How many of the 28 patients who died following operation, would have died without operation? How many of the 547 patients with fibroid tumors were saved from death by operation? What was the after-history of each one of the non-operated cases? When this additional information is obtained, then we will have some idea as to how many deaths from fibroid would have occurred without operation in this series of 547 cases.

"Practically the same deficiencies appear in all hospital series of fibromyoma cases, and in a measure necessarily so, for hospital records can not show the number of non-operated cases that come to death or operation after they leave the hospital.

"3. Large series of cases from private records show only a small proportion of the patients in really serious condition. There are many such reports. A recent one is that of Dr. E. J. Ill, of Buffalo, in which he reports all fibroid cases seen by him in the preceding three years. There were 300 cases. He operated on 53 and advised operation in 6 others, making 59 cases in which operation was required according to the indications that he followed. So we have here a large series of fibromyoma cases, carefully observed and reported, and in only about 18 per cent was 'life endangered' or 'health so impaired that life was a burden.' Eighteen per cent of serious terminations is not a small per cent for what some are pleased to style a 'harmless' growth.' But is that the total number of serious terminations in the whole 300 cases? How many of the patients who were in good conditions when he last saw them will progress to the same stage of the disease in which he saw the 18 per cent?

"Fibromyoma of the uterus is a very slow growing tumor. It may gradually progress over a period of twenty years or more. Taking off the first five years, as the tumor may not come under observation then, we have fifteen years of the growth's progress in which the patient is likely to consult a physician. If in a mixed series observed during a period of three years, 18 per cent are found to have reached the serious condition mentioned, what per cent will have reached the same condition when the same series has been observed six years or nine years or twelve years or fifteen years? Of course, it would not be true to assume that because observation of the series for three years showed serious terminations in 18 per cent, observation of the same series for fifteen years would show serious terminations in 90 per cent, but it would be much nearer the truth than the assumption of 18 per cent as the total serious terminations in the 300 cases.

"Physicians see but a small number of their fibromyoma cases to the end. The patient in the earlier stages of the disease drifts from one physician to another, helping to swell the list of patients 'not requiring operation' for two or three or more physicians. Later there develop threatening symptoms demanding operation, which is carried out. In the records of the last physician only does the case appear as one 'requiring operation.' So from this one case there would be statistical proof that operation is required in only 33 per cent of fibroid cases. This shows how easy it is to fall into serious error.

"In looking up the records of my own fibromyoma cases, in hospital and clinic and private work, I find that 17½ per cent were subjected to operation. Operation was advised in a number of other cases, but just how many I cannot state, as the recommendations were not always recorded. In about two-thirds of the total number of fibroid cases seen, there were, at the time, no urgent or threatening symptoms. But I do not deceive myself with the idea that, because these patients were in fairly good condition when last seen, they should therefore be classed as fibroid cases that at no time required operation. They could not properly be so classed until traced to the end.

"Even in the occasional case which is seen through all stages by one physician, the progress is so slow and the last stage is so far removed from the first, that the relation of cause and effect is in a measure overlooked. If the end came in two or three years, as in cancer, it would be impressive, but the first appearance of the tumor and the ultimate result being so far separated, the connection is somehow lost. The case seems an exceptional one, some new factor at work—the terminal condition can hardly be recognized as due to the 'harmless' fibroid which the patient has carried so many years without particular trouble.

"I mention these things because I believe that many are misled by them. The latest contribution to this part of the subject that has come to my notice, is that by Thos. Wilson, of Birmingham, England. He assures us, on practically the same deceptive evidence, viz., the analysis of a series of cases seen for a short time, that of fibroids giving rise to symptoms, only 30 per cent require removal. The remaining 70 per cent require merely watching and minor palliative treatment.

"As to what eventually becomes of this 70 per cent he furnishes no proof. However, in the recommendations for the care of them, after giving directions for the relief of various distressing symptoms, he states, 'And, finally, operation should be recommended when bleeding gives rise to anemia and does not yield to ordinary treatment; when pain is severe and obstinate; when pressure symptoms, especially retention of urine, occur; when the tumor is rapidly increasing in size; and generally when there is evidence that the health of the patient is becoming impaired'—and he might have added, when the kidneys are damaged; when the cardio-vascular system is seriously affected; when the patient is in bad condition for operation; and when the operative mortality is necessarily high. I fail to appreciate the advantages of the enumerated conditions secured by waiting.

"I am anxious to get at the real significance of the facts presented on this subject. I am not interested in supporting any particular theory. I have fibromyoma cases to treat, however, and I want to know what is best for them, and do not intend to be misled in the matter, one way or another, by taking facts to mean something that they do not mean, if I can avoid it. I am anxious to know all the facts against early operation as well as all the facts for it. I would gladly welcome any information establishing the safety of waiting in these cases, for no one feels more than I do the responsibility of advising a patient in comparatively good health to undergo the dangers of a serious operation.

" As to the conclusions in this matter, I would urge that each physician form his own opinion after critical consideration of established facts—not hastily, not too much influenced by the opinions of others, but carefully and seriously, as one who is personally responsible for the welfare of the patient.

"My own working rules in this matter, are as follows:

" **1.** A patient who has a small fibroid that is causing no symptoms, requires no treatment for the fibroid. Such tumors are rarely seen. Occasionally one is discovered in the course of an examination for symptoms plainly due to other cause. In such a case I usually do not mention to the patient that she has a fibroid, unless she asks directly concerning it, though I take pains to state the fact and its bearing to the husband or other responsible relative.

" **2.** A patient who has a tumor of moderate size, causing only slightly troublesome symptoms which may yield to general tonic treatment with the addition of uterine astringents (ergotin, stypticin), is put on that treatment for one to three months—long enough to satisfy me as to whether the symptoms will subside under this treatment. If so, the treatment is continued as necessary to control the symptoms. By 'control' of the symptoms I do not mean just to the extent that the patient can manage to get along as a semi-invalid, but to such an extent that they are not noticeable to her—that she is practically a well woman.

" If I find the symptoms persist after a satisfactory trial of this treatment, it means that they are due largely to the activity of the tumor, and not simply to the accompanying pelvic congestion (depending principally on some minor inflammatory trouble or on constipation or on methods of work or on other cause independent of the tumor). The persistence of symptoms, after a satisfactory trial of the measures to eliminate symptoms due to other causes, means that the tumor itself is already an active irritant in the pelvis. Not active in the sense that it is necessarily rapidly enlarging or degenerating, but active in the sense that it has not passed into the resting, non-active, clinically-cured state, but is working the other way. It is active in the same sense that a persisting appendicitis is active in the quiescent periods between the acute attacks. The difference is that the activity of the fibroid is more insidious, less disturbing for the time being, slower, not published by acute exacerbations—but nevertheless persistently progressive.

"However, before recommending operation in a fibromyoma case because of persistent symptoms, I take pains to make certain that the persistence of the symptoms is due to the tumor, and not to some associated condition or conditions that can be relieved by less dangerous measures.

" Having established beyond doubt that the tumor itself is already a continual irritant in the pelvis, I say to the patient substantially as follows:

" 'There is persistent trouble in spite of the treatment, and this trouble is due to the tumor. There is little chance of its getting better or of its remaining permanently stationary. The strong probability is that it will get progressively worse. And it may at any time get rapidly worse, and develop conditions that would increase many times the danger of the operation which would then be necessary to save your life, if it could be saved. I am satisfied that the danger of operation now is much less than the danger of delay.'

" **3.** In cases where the tumor is causing symptoms that plainly cannot be corrected by other measures, I at once recommend operation, without wasting time with the other measures.

" What about large tumors without symptoms? I am skeptical on the subject of large tumors without symptoms. They are certainly very scarce. I do not remember having seen any case of large fibromyoma in which careful inquiry did not show some evidence of disturbance from the growth before it had attained a large size—unless the following case, seen recently in consultation with Dr. C. O. C. Max, of St. Louis, could be classed as such.

"The patient, a white woman, aged 30, unmarried, noticed in a casual way, about the middle of last February, that the lower abdomen seemed rather larger and firm. Subsequent developments indicate that the tumor must have been of considerable size at that time, probably reaching half way to the umbilicus. Careful inquiry elicited no noticeable evidence of disturbance at that time, not even bladder irritation. As the patient felt well she paid no particular attention to the fullness of the abdomen. At the middle of March the menstrual flow was not so free as usual and, for reasons best known to herself, she became frightened and went to a midwife who, March 21, introduced a sound into the uterus and assured the patient there was no pregnancy. For two days she worked and felt well. The second night, however, she had a chill followed by fever and intermittent pains in the abdomen and a bloody flow with clots. The trouble increased and the patient's condition became serious and she called in Dr. Max, who very properly proceeded to empty the infected and partly emptied uterus. But there was not much material to be removed. The fever and pains kept up and the patient's condition became still more serious. It was then that I was asked to see her in consultation. Though it had been only eight days since the onset of decided symptoms, the fibroid uterus was then as high as the umbilicus.

"Thinking that possibly the acute infection was of such character that it would quickly subside, permitting a safer operation when the virulence was spent treated the case accordingly. But the fever continued high, the abdominal pains increased, the pulse became rapid and the patient, instead of getting better, went from bad to worse. So we were obliged to operate, April 14, in the presence of the acute infection. The specimen furnishes a particularly clear illustration of one of the dangers of a sloughing fibroid, so I brought it for your inspection (Figs. 610, 611). The necrotic fibroid has caused a perforation through the uterine wall into the peritoneal cavity.

"This was one of those mild cases that 'get along comfortably and present no justification for subjecting the patient to the risks of a serious operation.' There were no threatening symptoms, in fact, there were no symptoms of any kind that the patient had noticed, except a slight fullness in the lower abdomen. And yet within four weeks the patient was in a most serious condition, and had to be operated on in that condition with the greatly increased risk.

"There was a streptococcus infection, causing sloughing of the fibroid, and the large sloughing fibroid had caused perforation of the uterine wall, destroying an area as large as a silver dollar, as here shown. The omentum was adherent over this opening. When the adhesions were partially separated the bloody infected fluid from around the necrotic fibroid poured out into the peritoneal cavity. This gives an idea of the desperate character of the case. The operation was total hysterectomy. On account of the extensive infection, involving the peritoneal cavity, we drained freely both into the vagina and through the abdominal incision. The patient recovered, but it was a close call for her.

"Returning to the general subject of advice to fibromyoma patients, the three working rules just given very readily indicate in most cases whether the tumor should be let alone or removed. I refer to the general run of cases—the common forms of myoma in patients under ordinary circumstances.

"There are, of course, certain exceptional cases in which there must be taken into consideration special conditions—in the fibromyomatous uterus or in the age or physical condition of the patient or in her surrounding circumstances. For example, if the uterus is pregnant and the tumor is of such size and situation that it will probably not interfere with pregnancy and parturition, I would not interfere at that time. If the patient is in the menopause or safely through that period, I would feel justified in leaving some growths that I would not leave in a younger woman. Again, a patient may be in circumstances in which it is important that for a time she take no risk, not even a small one, unless absolutely forced into it by the most threatening conditions, as when she has small children wholly dependent on her for the time being. Again, the distribution of the tumor tissue has, in certain cases, a considerable influence on the decision, for example, a patient presenting several good-sized nodules in the uterine wall can wait with more safety than where the same amount of fibromyomatous growth is collected in one or two large tumors. There are many such special conditions that must be taken into consideration. This is true to such an extent that, in a measure, each case requires particular consideration and decision. This is the reason why it is impossible to formulate rules applicable to all cases.

"However, we necessarily, even in the exceptional cases, base our advice largely on some general guiding principles. And it behooves us to be certain that those general principles accord with the facts (the real facts and not the supposed facts) as far as the facts are known.

"In closing I wish to emphasize the following points:

"1. A fibroid tumor of the uterus, which has reached a size to be appreciated clinically, is a much more serious affection than is generally supposed.

"A considerable proportion of the patients develop fatal local conditions, another considerable proportion develop serious distant visceral degenerations, and a large proportion of the remainder (possibly most of them) finally pass into a condition of chronic suffering and invalidism.

"2. The progress of the disease is so slow as to be deceptive, many cases taking fifteen to twenty years to reach full development—hence the serious results do not appear in the observation of a series of cases for a few years, a few years constituting but a fraction of the developmental period.

"Yet the wide-spread teaching that serious conditions develop in only a very small proportion of the cases, is based largely on just such limited observations, recorded and unrecorded. No large series of consecutive cases followed to the end without operation has shown a small mortality.

"3. Uterine fibroid kills principally by inducing serious local and general complications, that go down in the mortuary records as the cause of death—hence mortuary records give no indication of the ravages of the disease. It kills secretly and indirectly, but none the less surely.

"4. The proportion of the various classes that (a) go on to a fatal termination or (b) become chronic sufferers and invalids or (c) develop no serious symptoms, can be exactly determined only by securing accurate records of a large series of cases, comprising all classes, from the beginning of the trouble to the end.

"5. Enough is already known to show that delay is dangerous. Many patients develop fatal conditions, many find operation necessary when in such a state as to make the operation exceedingly dangerous, and some must be refused operation because of advanced complications — nearly all of which loss of life and health could have been prevented by early operation.

"6. The chance of satisfactory improvement after the menopause is, speaking generally, more than overbalanced by the frequency of serious degenerative changes and complications.

"7. We assume a grave responsibility when we advise a patient to wait until serious symptoms develop before having the tumor removed.

"Early operation, under proper conditions, means small risk to the patient. Late operation means great risk."

PREGNANCY AND FIBROID.

The association of fibromyoma with pregnancy is always a matter for serious concern, though many patients get along without trouble. Lafour, in a series of 300 cases of fibroid and pregnancy in which delivery took place by way of the birth canal, found the maternal mortality 40% and the infantile mortality 77%. In a series of 147 cases of fibroid and parturition, collected by Susserott, the maternal mortality was 53% and the infantile mortality 66%. In 20% o
cases forceps were used, with the loss of 8 mothers and 13 a

"Johnston estimated that during pregnancy or labor one-third of the mothers and more than one-half of the children die, and recommends celibacy when the tumor can not be removed." Rosenwasser said in 1899 that antisepsis and improved technique had reduced the maternal mortality only to 37%.

Methods of Treatment.

1. **Non-interference.** The patient is allowed to go along until term, in the hope that there may then be a satisfactory delivery (spontaneous or operative). As mentioned later, this is the preferable plan in many cases. The results have been reported in various series of cases, as follows:

Spontaneous delivery. In a series of 84 cases of labor complicated by fibroids, 64% of the patients managed to deliver themselves, while 36% required assistance by forceps or otherwise.

Forceps. In Veit's series of 39 forceps cases, the maternal mortality was 33% and the infantile mortality was the same.

Version. In Veit's series of 87 version cases, the maternal mortality was 64% and the infantile mortality 82%.

In fibroid cases there seems to be a marked tendency to ADHERENT PLACENTA. In a series of 147 cases of fibroid complicating labor, manual removal of the placenta was necessary in 21 cases, and 13 of these women died. This serves to call attention to the difficulties of this condition, which is always a serious one in the presence of a fibroid.

Caesarian section. In Sanger's series of 43 cases, the maternal mortality was 83.7% and in Pozzi's 28 cases the maternal mortality was 86%. In 48 Porro operations in fibroid patients, the maternal mortality was 33%. In a later series of 49 cases of the Porro operation in fibroid patients, the maternal mortality was only 12.5%, showing that immediate removal of the fibromyomatous uterus is the safer operation.

2. **Myomectomy.** The patient is subjected to operation for the removal of the tumor, but the pregnancy is allowed to continue—if it will. Leopold, in his myomectomies in the pregnant uterus, from 1884 to 1894, had a maternal mortality of 17.4% and a fetal mortality of 37.6%. Stavely had a maternal mortality of 24.2%. The probability of abortion is great and must never be lost sight of, though many cases of extensive myomectomy have recovered without abortion. Olshausen reported 21 myomectomies. Abortion followed in 38%. In a series of 57 myomectomies and enucleations during pregnancy, 12% of the women died and 24% aborted.

3. **Hysterectomy.** The fibromyomatous uterus is removed in early pregnancy. In a recent series of 89 cases of supravaginal hysterectomy for fibroid complicated by pregnancy, the mortality was 11%. When the operation is carried out promptly (before serious complications intervene) the mortality is very little higher than hysterectomy in the non-pregnant.

4. **Induced abortion.** As the patient is in a serious condition and her life threatened, the plan of emptying the uterus has been suggested and carried out. Lafour collected 39 cases of fibroid and pregnancy in which this method of treatment was

employed. The mortality was 36%. In the case of a fibromyomatous uterus the dangers from abortion (spontaneous or induced) are great, because of the difficulty of completely emptying the uterus and the consequent frequency of hemorrhage and sepsis.

Selection of treatment.

The treatment to be employed depends on the size and location of the fibromyoma and the stage of pregnancy at which the patient is seen.

When the tumor is in the upper part of the uterus and is of small or medium size and not causing much trouble, it should be let alone until after parturition.

When the tumor is so large or so situated (cervix fibroid) that it precludes the possibility or probability of full-term delivery per via naturalis, the treatment turns somewhat on the stage of pregnancy. If the patient is seen in early pregnancy, hysterectomy is the safest plan of treatment. In some exceptional cases the tumor may be so situated that myomectomy (abdominal or vaginal), with hope of continuing the pregnancy, is justifiable.

If the patient is first seen in late pregnancy, it may be advisable to postpone operation until full term or nearly full term, with the hope of saving the child by Caesarian section.

Of course, there are all gradations in seriousness, from the cases where it is almost certain that there will be no trouble to the cases in which full-term delivery by the natural route would be absolutely impossible. It is the middle class that contains the cases that furnish the most puzzling problems. When seen in early pregnancy there is an uncertain factor, namely, the probable extent of development of the fibroid during pregnancy. This makes it difficult in some cases to decide just which line of treatment is preferable. In cases of doubt after giving due consideration to the various aspects of the case, the rule is to await developments.

A numerous class of fibroid cases complicated by pregnancy, is that in which the patient has one or more fibroids that give no particular trouble until she becomes pregnant. After the patient has been pregnant three or four months the symptoms become so acute and threatening that the tumor and uterus must be removed or the uterus must be emptied, with the dangers incident to miscarriage in these cases (see above) and the probability of operative removal of the tumor and uterus later. I think immediate hysterectomy is the safest plan under these circumstances. The choice of the treatment in such cases is discussed in detail in a paper I read before the St. Louis Medical Society in 1901.*

LIPOMA OF THE UTERUS.

Lipoma of the uterus is rare, so rare as to constitute a curiosity. A few cases have been reported, one of which is shown in Fig. 361. A lipoma in the uterine wall may come without particular cause, as in other situations, or it may come from fatty degeneration of a fibroid. The symptoms and treatment are practically the same as for fibromyoma. The exact diagnosis is made after the mass is removed and laid open.

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* Report of Two Cases of Pregnancy Requiring Operation, by H. S. Crossen, M.D. St. Louis Medical Review, Aug. 24, 1901.

CHAPTER IX.

MALIGNANT DISEASE OF THE UTERUS.

Malignant disease of the uterus occurs in the form of carcinoma and sarcoma. Carcinoma of the cervix uteri is so different clinically from carcinoma of the corpus uteri, that I think advisable to consider the two separately. The subject of this chapter then may be divided into three parts, as follows:

- **Carcinoma of the Cervix Uteri.**
  - Squamous-cell Carcinoma (Epithelioma).
  - Cylindrical-cell Carcinoma (Adeno-carcinoma).
  - Malignant Adenoma.
  - Endothelioma.
- **Carcinoma of the Corpus Uteri.**
  - Adeno-carcinoma.
  - Malignant Adenoma.
  - Endothelioma.
  - Chorio-epithelioma.
- **Sarcoma of the Uterus (Cervix and Corpus).**

CARCINOMA OF THE CERVIX UTERI.

This term signifies malignant disease of epithelial origin, situated in the cervix. It may arise from the squamous epithelium covering the vaginal surface of the cervix, in which case it is a squamous-cell carcinoma and is ordinarily designated as "epithelioma." It may arise from the glandular epithelium in the interior of the cervix, in which case it is a cylindrical-cell carcinoma and is ordinarily designated as "adeno-carcinoma."

ETIOLOGY.

The cause of carcinoma, as of other forms of new growth, is still a mystery. As in the case of fibromyoma, there are some interesting theories but they are still theories only.

PATHOLOGY.

Cancer of the uterus is, in the beginning, essentially a local process. The apparently independent growths appearing later in various organs, are simply metastases from the primary tumor. This fact has been firmly established by the most thorough and painstaking investigation by many authorities. The supposition that it is simply the local manifestation of some constitutional dyscrasia, has no foundation. The important bearing of this on treatment is apparent.

Frequency. As far as known at present, primary carcinoma occurs more frequently in the uterus than in any other organ, carcinoma of the stomach coming next in frequency. Welch found in a series comprising 31,000 carcinoma cases that the primary growth was in the uterus in approximately 29% and in the stomach in 21%.

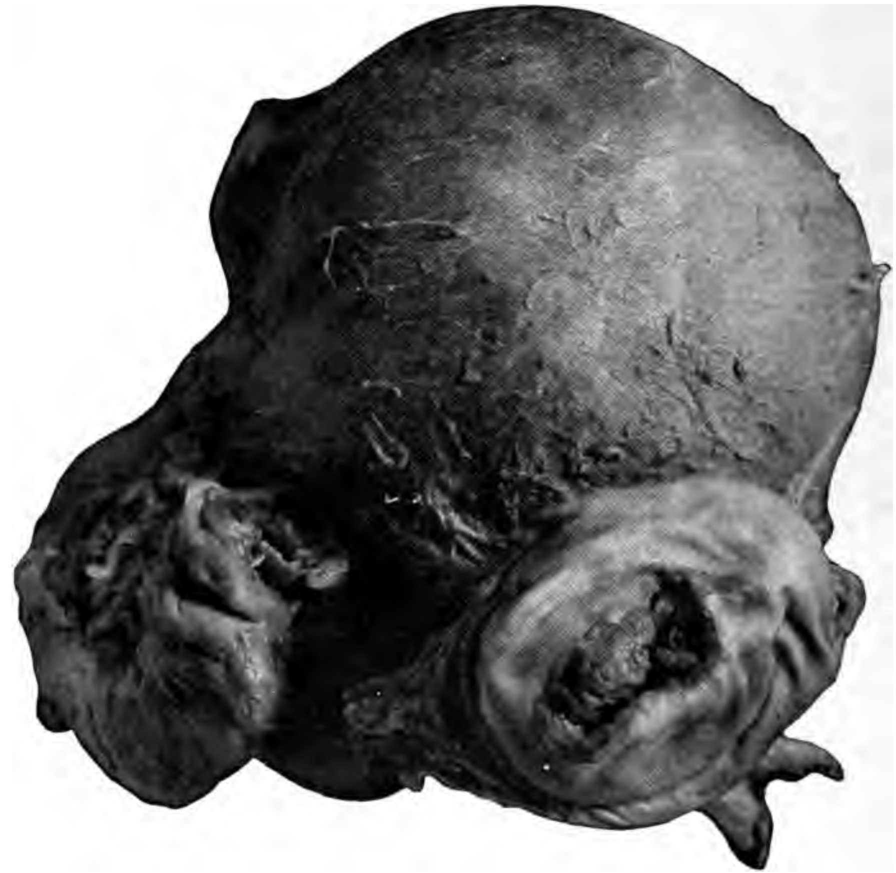

Fig. 616. A Small Epithelioma of the Cervix Associated with Fibromyoma of the Corpus Uteri. In this case the most evident lesion was the fibroid, but further examination revealed induration and irregularity about the external os, with some bleeding on examination. A piece of tissue excised from the suspicious area and submitted to microscopic examination showed epithelioma. The specimen is shown sectioned in Fig. 617.

Most carcinomata of the uterus occur in the cervix. Cullen, in a strict analysis of his 128 cases of carcinoma of the uterus, found that 74 were epitheliomata of the cervix, 19 were adeno-carcinomata of the cervix and 35 were adeno-carcinomata of the corpus uteri. The great frequency of carcinoma in the cervix is supposed to be due largely to injuries there in child-bearing, with resulting scar-tissue, inflammation, cystic degeneration and chronic irritation. It is rare in the uninjured cervix, though some cases have been reported, even in children.

Varieties. Carcinoma of the cervix occurs in two principal forms—epithelioma (squamous-cell cancer) and adeno-carcinoma (cylindrical-cell cancer), the epithelioma being by far the more frequent (74 to 19 in Cullen's cases).

Epithelioma of the cervix originates from the squamous epithelial cells covering the vaginal portion. Arising from that part of the cervix known as the "portio vaginalis," it is sometimes spoken of as "cancer of the portio."

The disease begins as a small area of infiltration on the vaginal surface of the cervix, supposedly at a point of persistent irritation from scar-tissue or erosion or other irritating process. If the patient happens to be examined at this stage, the infiltrated spot feels rather firm to the touch. That is all. There is no pain, there may be no bleeding or discharge, though there may be some discharge from the preceding chronic irritation. As far as the naked-eye appearance is concerned, it does not differ materially from a small area of chronic inflammatory infiltration or erosion. The essential pathological change is that, at the point indicated, the squamous epithelium is beginning to penetrate into the underlying connective tissue. This invasion is resisted by the leucocytes which collect in the adjacent tissue. As the process continues, the carcinomatous infiltration, with the opposing round-cell (leucocyte and lymphocyte) infiltration, penetrates deeper into the tissues and the small area of induration gradually increases in extent. A small abrasion or ulcer appears (Figs. 616, 617, 443). This usually bleeds slightly when touched. Frequently the first evidence of anything wrong that the patient notices, is a slight streak of blood or spot of blood after coitus or after extra walking or other exertion. This may remain the only external evidence of the disease for many months—in fact, in a considerable proportion of the cases, no other symptoms appear until the disease has penetrated deeply into the cervix and out into the parametrium.

As the disease extends in the cervix, more infiltration becomes appreciable on palpation and more ulceration (which may be mistaken for laceration or erosion) may be seen through the speculum (Figs. 618, 445).

Still later there may be ulceration into the rectum or bladder (Fig. 619), forming fistulæ which add greatly to the patient's suffering.

As the disease advances, projecting growth may occur, causing distinct papillary outgrowths on the affected portion of the cervix (Fig. 447). Still later the cervix may be replaced by a papillary fungus tumor-mass. On the other hand, particularly in the aged with very slow-growing epitheliomata, the formation of contracting scar-tissue may so draw in the affected region that it can not be seen. In such a case it can be appreciated only by palpation, which reveals induration at the vaginal vault (Fig. 446).

In addition to the regular and essential elements of the diseased tissue, there may be secondary changes. Areas of softening and degeneration occur in which the cells are broken down and become simply fluid and debris. Hemorrhage into certain parts of the growth may occur and, as a result of that hemorrhage, there remain clots and discoloration and fluid. Infection may take place, leading to suppuration or sloughing. Occasionally lime salts are deposited in the cancer cells. This chalky deposit may be extensive and may even be found in the metastases.

Adeno-carcinoma of the cervix arises from the cylindrical cells lining the interior of the cervix and forming the cervical glands. It may then in the beginning be located at the external os or in the cervical canal or in any part of a gland extending deeply into the cervical wall. As the cell-columns penetrate the underlying tissues, the cells assume somewhat a gland formation owing to this derivation from gland-forming epithelium. This gland formation, however, is very irregular and atypical, being represented to a large extent only by solid columns of cells. "Malignant adenoma" is a rare form of adeno-carcinoma in which the penetrating cells preserve, to a marked extent, the glandular arrangement.

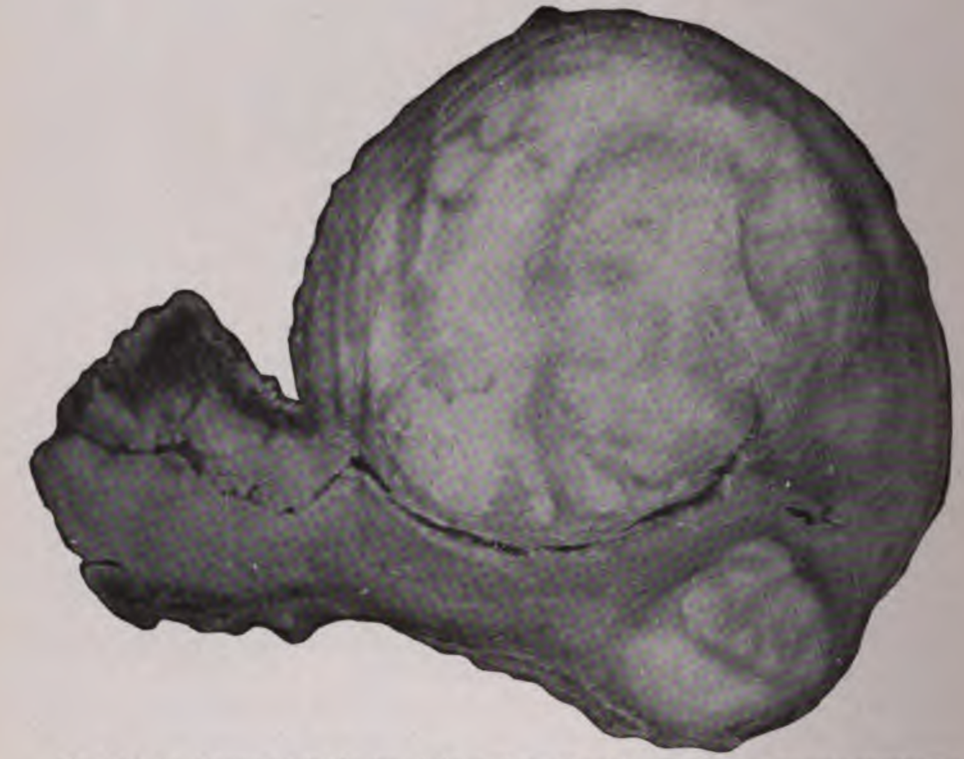

Fig. 617. An Antero-posterior Section of the specimen shown in Fig. 616. Microscopic examination showed that the epithelioma extended along the cervical canal practically to the internal os.

The infiltration in adeno-carcinoma, being situated in the interior of the cervix, is not appreciated by the examining finger until a considerable mass has formed. The disease pursues much the same general course as described for epithelioma, the carcinoma cells penetrating deeper and deeper into the cervix and into the surrounding connective tissue (Fig. 620).

Endothelioma is a rare form of malignant disease of the cervix in which microscopic examination shows spaces lined with proliferating cells resembling endothelium. Its exact nature and origin have not been determined—in fact, it is still uncertain whether it is an epithelial growth (carcinoma) or a connective-tissue growth (sarcoma).

Modes of extension. Carcinoma of the cervix extends in four ways—by continuity of tissue, by the lymphatics, by the blood-stream and by implantation.

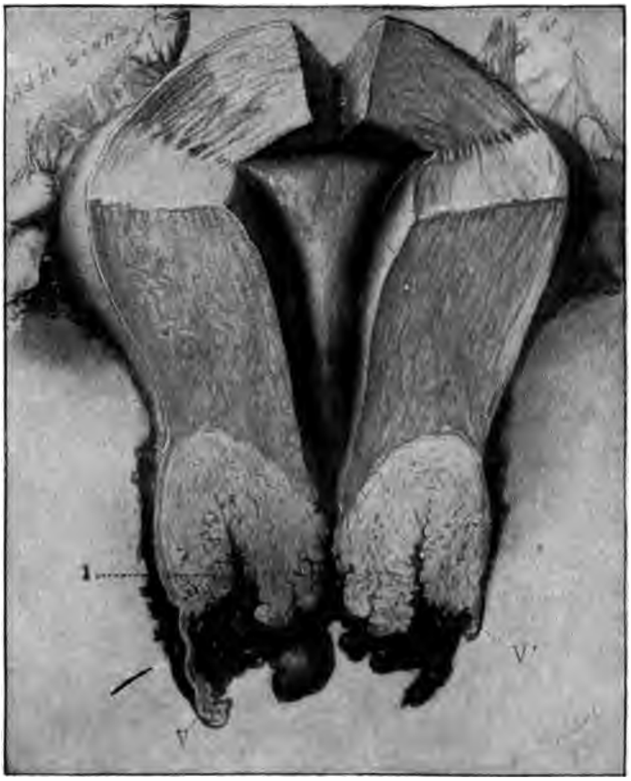

Fig. 618. An Epithelioma of the Cervix Uteri, advanced to stage of the destruction of the cervix. (Cullen—*Cancer of the Uterus.*)

Extension by **continuity of tissue** is the principal method and, aside from exceptional cases, the only method in the earlier stages of the growth. In this method of extension, the carcinoma cells grow into the tissues against which they lie. This differs markedly from the way in which a non-malignant tumor extends. A fibromyoma as it grows, pushes aside the adjacent tissues, but a malignant tumor as it grows *penetrates* the adjacent tissues and destroys them.

It is this insidious involvement of contiguous tissues that makes many cervical carcinomata inoperable when first seen. It is this same gradual extension outward by continuity of tissue that later causes the patient most of her suffering and that in most cases causes her death, by involving the uterus or bladder or rectum.

In extension through the lymphatics, some carcinoma cells are caught in the lymph current and carried to lymphatic glands, where they lodge and grow and destroy tissue the same as the parent growth. This invasion of the lymphatic glands by carcinoma cells does not occur usually until rather late in the disease—until it has extended by continuity of tissue through the cervix into the parametrium.

Winter found cancerous glands in only 2 cases in 44 autopsies on patients where the disease was confined to the uterus. Wertheim, in 60 operated cases, found involvement of removed glands in 15 per cent of early cases and in 31.7 per cent of all cases. Schauta made a most thorough autopsy-study of 60 cases, in 40 of which the patients died from the natural effects of the cancer and in 9 from intercurrent affections. In 43.3 per cent of the whole series, the glands were entirely free of carcinomatous metastases. The lower (removable) glands alone were

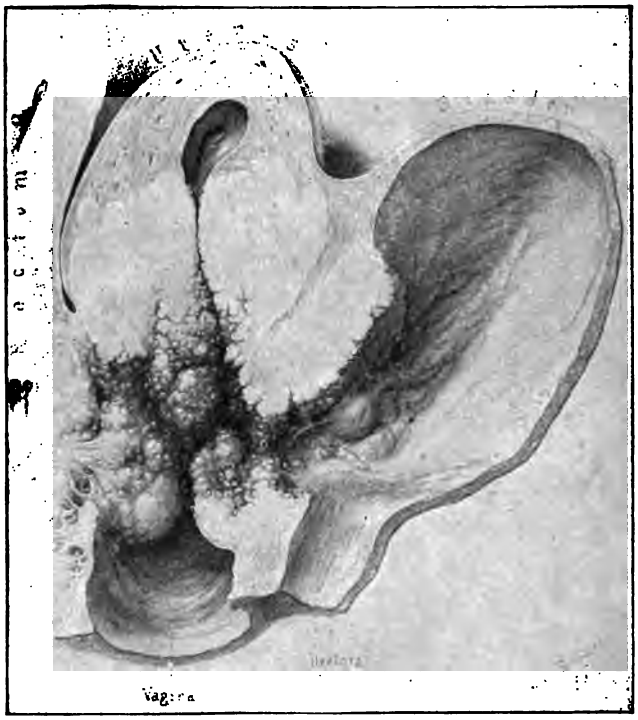

Fig. 619. An Epithelioma of the Cervix Uteri, still farther advanced. The growth has invaded the bladder and rectum, causing fistulæ into these organs. (Cullen—*Cancer of the Uterus.*)

involved in 13.3 per cent, the upper (not removable) glands alone in 8.3 per cent and both lower and upper glands in 35 per cent.

Kundradt, in a study of 76 cases operated on by Wertheim, in which the parametrium was involved on one or both sides, found the glands entirely free of metastases in 71 per cent. The glands on one side were involved in 22 per cent, and the glands on both sides were involved in 7 per cent.

The glands are rarely involved until the cancer has advanced into the parametrium. Kundradt, in his analysis of 80 cases, found only four in which the glands were involved with the parametrium free.

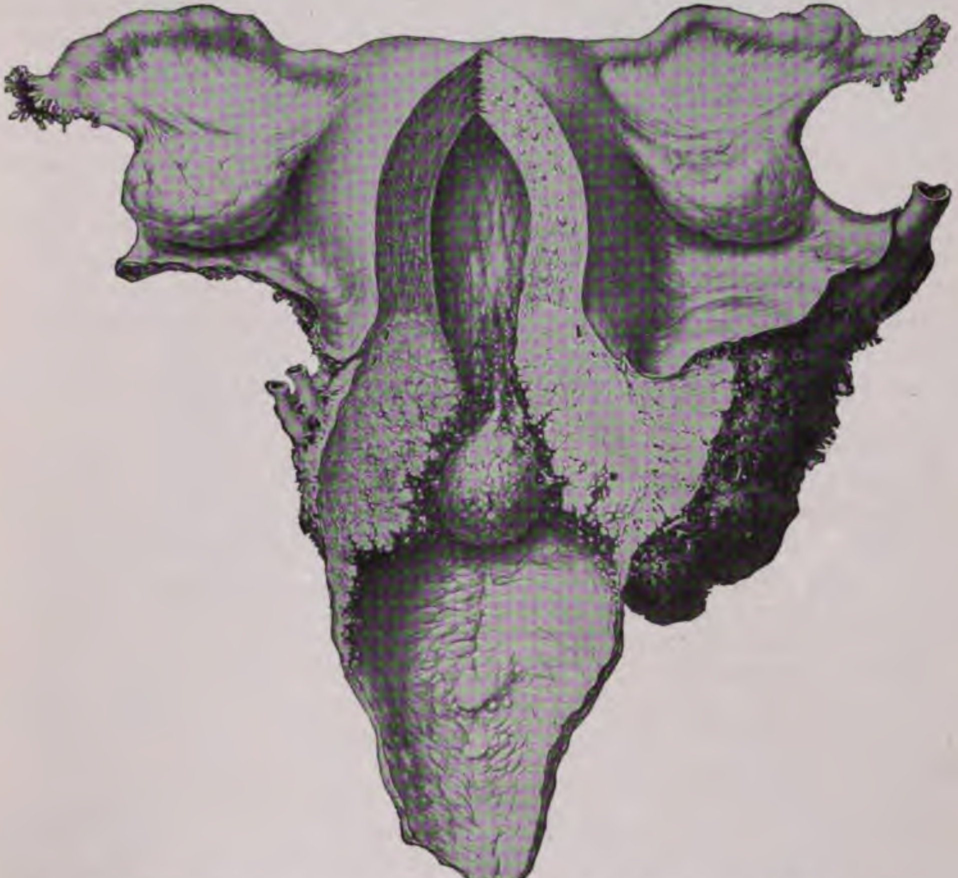

Fig. 620. Advanced Adeno-carcinoma of the Cervix Uteri. Notice the involvement of the parametrium. (Kelly—*Operative Gynecology*.)

Enlargement of the regional glands is very common in the early stage of carcinoma but this enlargement is, as a rule, not due to carcinoma cells but to the inflammatory hypertrophy that nearly always takes place in the glands draining a region that is subject to severe chronic irritation. In exceptional cases, however, the glands may become infected with carcinoma cells at an early stage of the disease.

This matter of glandular involvement has a very important bearing on the question of operative treatment.

In extension **by the blood stream,** some carcinoma cells penetrate into a blood-vessel, are caught in the current and are carried to distant organs, where they lodge and grow and form metastatic tumors. In whatever kind of tissue these metastatic growths are situated, they reproduce the structure of the parent growth. The lungs are most frequently affected, though there are many other organs that are affected occasionally. The possibility of metastases must be kept in mind in deciding whether or not a case is operable. If metastasis to distant organs has occurred, hysterectomy would of course be useless except as a palliative measure. However, such metastases almost never occur except in the last stage, and then not very frequently. Winter, in 202 cases, found metastases in distant organs in only 2½ per cent.

Direct implantation of cancer cells into the healthy tissues of a raw surface takes place principally in operations for cancer—the cells being carried on the knife or scissors or other instrument, or on the fingers or sponges, from the infiltrated area to the healthy tissue which has been laid open in the operative work. Many undoubted instances of this occurrence are on record. It furnishss a strong reason for keeping entirely clear of the involved area in operations for the cure of cancer.

Complications. Aside from the tumor itself, there are several conditions resulting from it that enter into the pathological and clinical picture. The ureters may be compressed, leading to dilatation of the ureters and also to hydronephrosis (Fig. 621). In the later stages there is compression of the pelvic nerves and vessels, causing pains and edema. The infiltration may penetrate the wall of the bladder or rectum, and if the infiltrated tissues break down, fistulae into these organs are formed (Fig. 619).

Associated diseases also add to the pathological picture in certain cases. Fibromyoma of the uterus is a rather frequent association (Figs. 616, 421). Various inflammatory lesions are frequent and add much to the danger and difficulties of operative treatment.

Duration of the disease. This is variable, the limits ordinarily being one to three years. The duration depends somewhat on the KIND OF TUMOR (the softer the tumor the more rapid the growth), upon the AGE OF THE PATIENT (the younger the patient the more rapid the growth) and upon the PROXIMITY TO CHILD-BIRTH—those carcinomata appearing within one year after parturition progressing very rapidly.

These are only general rules, to which there are, of course, exceptions.

Effect of pregnancy. Sometimes carcinoma of the cervix may appear while the patient is pregnant, or occasionally pregnancy may take place in the early stage of carcinoma of the cervix. In either case the effect of pregnancy is to hasten the progress of the carcinoma. The softening of the tissues and the congestion associated with pregnancy, seem to favor rapid extension of the malignant disease.

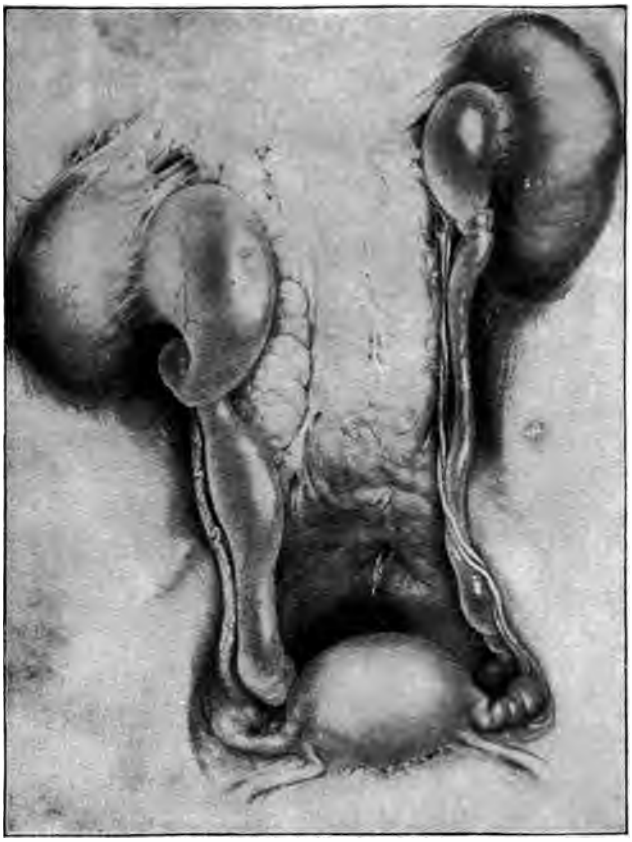

Fig. 621. Dilatation of the Ureters and Kidneys, due to obstruction of the ureters by Cancer of the Cervix Uteri. (Kelly—*Operative Gynecology*.)

SYMPTOMS AND DIAGNOSIS.

The first symptom, in practically all cases of carcinoma of the cervix is a slight leucorrhoeal discharge, with an occasional spot of blood. This slight streak of blood is seen usually after extra exertion (extra work, long walk, lifting) or after a douche or after coitus. It is especially liable to appear within 24 hours after coitus. A history of such "spotting" of the discharge or of the clothing, calls for a most careful examination, that the presence or absence of carcinoma of the vaginal surface of the cervix or of the interior of the cervix, may be certainly determined.

In giving the symptoms and the diagnosis of this disease, I shall speak nearly altogether of the *early* stage. It is in this stage that the diagnosis is most difficult and it is in this stage that the diagnosis is most important, for operation then will, in a large proportion of the cases, save the life of the patient. In this connection it will be an advantage to consider the differential diagnosis between the early stage of malignant disease of the uterus *in general* (both carci-

noma and sarcoma) and the conditions with which it is likely to be confused. This is a very important subject, particularly to the general practitioner who usually sees the patient first and upon whom rests the responsibility of recognizing malignant disease in its beginning, or of recognizing the cases in which it may be present and which require special investigation accordingly.

Concerning **early diagnosis** of malignant disease of the uterus, I quote from a paper of mine published in 1900:*

"How, then, are we to discharge our responsibilities in this matter? We can not curet every woman that comes to us, nor excise and examine a piece of the cervix, simply because she might have cancer.

" What is needed is the adoption of a practical mode of procedure for determining certainly, in patients with uterine disease, whether or not malignant infiltration is present.

"Malignant disease of the uterus means carcinoma or sarcoma. Carcinoma may start from the squamous epithelium covering the cervix or from the cylindrical epithelium lining the canal of the cervix and body of the uterus or from the gland-cells situated deeply in the substance of the cervix and body. Sarcoma may start from any part of the organ.

"Malignant trouble is invariably **chronic** and there is always present either **induration** or **ulceration.**

"In the CERVIX, if there is induration it can be felt. If there is ulceration or erosion of the outer surface of the cervix it can be seen. If there is ulceration within the cervical canal it will cause a troublesome discharge.

"In the BODY of the uterus, if there is ulceration it will cause a troublesome discharge. By "troublesome discharge" I mean what is ordinarily called "leucorrhoea"—not the watery discharge of advanced cancer. Induration in the body of the uterus can not, of course, be detected until a considerable mass has formed. I am satisfied, however, that practically every case of malignant disease of the body of the uterus, whether carcinoma or sarcoma, presents a discharge while the infiltration is still in an early stage—that is, before it has gone beyond the reach of radical operation.

"In forming a conclusion as to whether or not a lesion is malignant, we should not give too much weight to the youth of the patient. To be sure, in carcinoma the patient is usually past thirty-five. But carcinoma may occur before thirty. One patient for whom I did an abdominal hysterectomy for carcinoma was but twenty-eight and the disease had then been present long enough to form a large mass and had been giving her much trouble for several months. Several cases of this disease in patients under twenty have been reported. Sarcoma may develop at any age.

"Called to see a patient with pelvic disease, if there is no erosion or ulceration of the cervix, no induration of the cervix or body of the uterus, and no chronic pathological discharge, we are safe in assuming that the uterus is free from malignant trouble. When any of these signs are present we must make a **differential diagnosis.**

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* Early Recognition of Uterine Cancer. H. S. Crossen, M. D. St. Louis Courier of Medicine, 1900.

Induration in the Cervix.

"Induration in the cervix may be due to cystic disease or to scar-tissue from laceration or to a fibroid or to malignant disease.

In **cystic disease,** if the nodule be punctured and then pressed upon the characteristic clear glairy substance will be extruded and the induration will largely disappear. If there remains enough induration to make the diagnosis doubtful, excise a small wedge-shaped piece and submit it to a pathologist for examination.

"In **scar-tissue** from laceration, the induration is limited to the site of injury and the cause is plain. Also in, scar-tissue the area of induration remains practically the same, whereas if malignant the area of induration gradually increases. In this case, as in every other, if there is reasonable doubt after a short period of careful observation, excise a piece for microscopic examination.

"In **fibromyoma** of the cervix, fibroids elsewhere in the uterus may often be detected, making it probable that the nodule in the cervix is similar in nature. A well-marked tumor of the cervix, even a fibromyoma, should be removed, for almost without exception a fibroid in that situation causes very troublesome symptoms. A small mass with no fibroids elsewhere should have a piece excised to make certain the diagnosis.

Ulcer or Erosion on Cervix.

"An ulcer or a spot of erosion on the cervix may be due to an irritating discharge, to a pessary or other irritant, to eversion of the mucous membrane by laceration, or to tuberculosis, syphilis, chancroid or cancer. In the first two mentioned the lesion heals promptly on removing the cause.

"Where the **cervix is torn** so deeply that the mucous membrane is everted and granulating, the cervix should be repaired, and the tissue removed in the denudation for repair may be examined microscopically. If there is no malignant trouble, the cervix will be in much better condition than before, and we will have satisfied ourselves that it was only simple trouble and the patient need never know that there was a suspicion of malignancy. If malignant infiltration is found in the excised tissue the uterus can be removed at once with the probability of a permanent cure.

"**Tubercular ulceration** of the cervix is rare. The diagnosis is made from microscopic examination of pus and scrapings from the diseased area.

"In **syphilitic ulceration** there are usually other lesions or a history which makes the diagnosis clear. Furthermore, a syphilitic lesion of the cervix, whether primary, secondary or tertiary, should yield within a reasonable time to appropriate treatment, provided the patient's general health is not too much depressed.

"**Chancroidal ulceration,** which is thoroughly causterized, should within a short time thereafter show healthy granulation and rapid healing. A sore on the cervix that resists appropriate treatment should have a piece removed for examination.

"The following method of differential diagnosis has been proposed: Soak a pledget of cotton in 10 per cent copper sulphate solution and apply it, for a minute or two, to the suspicious surface. If the lesion is a simple erosion, a bluish-white coating will form without hemorrhage. By repeating the application at intervals of three or four days the erosion will soon be healed. If the lesion is an ectropion it will be blanched by the application. If the lesion is cancerous ulceration, the copper sulphate application will cause bleeding. A few days later another application is made, and if the bleeding is more free the diagnosis of incipient carcinoma is almost certainly correct. Heitzman, who brings forward this method, states that he rarely failed to find microscopic confirmation of this provisional diagnosis. In all ulcerations except malignant, the bleeding is checked by the copper sulphate of solution in a few applications, and the persistence of a single bleeding point after the rest of the raw surface is healed indicates malignancy and calls for a microscopic examination of tissue from the suspected area.

Discharge From the Uterus.

"There still remain for differential diagnosis the diseases causing uterine discharge, and here is where the difficulties begin and where there have been so many failures. I say 'many failures,' for of the hundreds of women who die annually of cancer of the uterus, I believe a large number go to physicians in the early stages and are treated for chronic endometritis.

"Taking up the differential diagnosis, we know that malignant disease is always *chronic*. So we can eliminate at once all the acute diseases, leaving only the following: CHRONIC ENDOCERVICITIS (septic, gonorrhoeal and glandular), CHRONIC ENDOMETRITIS (simple, septic, gonorrhoeal and tubercular), POLYPI and FIBROMYOMATA.

"In differentiating these affections from malignant trouble the effect of treatment is an important item. Inflammation of the uterus in any form is greatly benefited by appropriate treatment. Consequently every case of uterine disease presenting induration, ulceration, or discharge, should be subjected to careful and vigorous treatment for the purpose of differential diagnosis as well as for the purpose of effecting a cure.

"**Chronic Endocervicitis.** In suspected chronic endocervicitis, a very good plan is to give a hot antiseptic douche two or three times daily, and every second or third day apply a 4 per cent silver nitrate solution, or tincture of iodine, to the cervical canal. If there is a marked congestion of the cervix, make multiple punctures. If the external os is so small as to interfere with drainage, open it by dilatation or incision. If there are cysts, puncture and evacuate them and touch the cavities with silver nitrate or tincture of iodine or carbolic acid. If there are polypi, remove them. If the cervix is hypertrophied and riddled with cyst, excise most of the diseased area and repair the cervix or partially amputate it.

"Any tissue removed from the cervix, either curetings or polypi or pieces removed in denudation for repair, should be subjected to a microscopic examination in every case that is the least suspicious. The simple fact that cystic disease is present does not exclude cancer. Both may be present, and if the pathological discharge persists after a course of treatment, a piece should be excised from the suspicious area.

"**Chronic Endometritis.** Simple endometritis—that is, where there is no pus infection—is due usually to poor blood or a malposition or a stenosis or subinvolution or a tumor. Remove the cause and, if the changes in the endometrium are not marked, they will subside spontaneously or after a few astringent applications. If the pathological changes are marked, it is not sufficient to remove the cause but we must remove also the diseased endometrium, that a new and better one may develop under the bettered conditions. If the case is not perfectly plain, the scrapings should be examined microscopically that the diagnosis may be confirmed or disproved.

"In chronic septic endometritis and in chronic gonorrhoeal endometritis, the idea of effecting a cure by long-continued intra-uterine applications, repeated week after week and month after month, is a delusion and a snare. These long-continued applications rarely if ever effect a cure, they frequently cause extension of the inflammation to the tubes, and worse still, they deceive the patient and the physician with the thought that something is being done towards a cure—whereas, little or no real progress is made against inflammation, and if malignant disease be present it is allowed to develop till it is past cure.

" In all these cases in which the trouble persists after a course of treatment including a few intra-uterine applications, the uterus should be carefully cleared out with a curet. Then if the trouble is only inflammation, the patient is in a fair way to get well, and if the microscopic examination of the scrapings shows malignant disease, the uterus can be removed in this early stage with a well-founded hope of saving the patient's life.

" **Fibromyomata** are frequently multiple, and when only a single tumor can be felt it may be of such large size or have existed so long with but little disturbance, that malignancy is excluded. But there are many cases in which the mass is small and as far as known has existed only a short time. In these cases the most important point in the differential diagnosis is the change that takes place in the endometrium in the two diseases.

" A fibromyoma frequently causes a chronic hypertrophic endometritis which gives rise to discharge and hemorrhage.

" A malignant tumor starting deep in the uterine wall may at first cause similar changes, but in the course of time and before it reaches a large size or passes beyond the limit of complete removal, it extends to the endometrium, and characteristic elements will be found in the uterine scrapings. Furthermore, the great majority of malignant growths of the body of the uterus *begin* in the endometrium and so produce characteristic changes there in the very earliest stage.

" Therefore, in a case of small tumor of doubtful character, accompanied with discharge or bleeding, curetment is advisable as a means of diagnosis. If the uterine scrapings do not show malignant infiltration we are justified in assuming that the tumor is a fibroid, but if the scrapings do show malignant infiltration the radical operation is, of course, indicated at once.

" Another point which should be kept in mind is that a malignant tumor which at first causes disturbance of the endometrium by pressure or proximity only, may later send its characteristic elements to the endometrium where they can be reached with the curet. Consequently, when the first examination shows nothing malignant, if signs of marked endometrial disturbance again appear, the diseased tissue should again be removed for examination.

"In the later stages also of uterine tumors, curetment is valuable as a diagnostic means. For instance, a patient presents a large tumor of the uterus of doubtful character, with pain and discharge and marked disturbance of the general health. Curetment will lessen the hemorrhage and discharge temporarily and will furnish tissue for examination. If the scrapings show no malignant infiltration, the tumor is probably a fibroid and removal may be indicated. If the scrapings do show malignant trouble, only palliative measures are indicated, as the growth has advanced too far for complete removal.

"There remains still unmentioned the one form of malignant disease that is most difficult of positive diagnosis. I refer to a malignant tumor GROWING IN A FIBROID or resulting from the degeneration of the same. In a number of well-authenticated cases, malignant tissue has been found in tumors that were undoubtedly for several years simple fibroids. Fibrocystic tumors seem more dangerous in this respect than the solid tumors. The cases are not very frequent but they do occur, and a fibroid that takes on rapid growth at any time near the menopause is open to this suspicion. As the malignant infiltration is for a long time confined within the fibroid, it does not reach the uterine canal, and a positive diagnosis can be made only by removal of the tumor."

In the **later stages** of carcinoma the pressure symptoms and other complications mentioned under pathology, develop and cause the patient much suffering. Cancerous CACHEXIA (a yellowish anemic color with emaciation, due to deterioration of the blood) appears, and also a FOUL DISCHARGE and PERSISTENT BLEEDING. If the cervix is involved, a fungating mass may be felt in the vagina.

In the differential diagnosis of cancer, I have purposely avoided giving prominence to these symptoms, for they represent a late stage of the disease. The diagnosis should be made before such symptoms develop, if the patient comes under observation in time.

In working for general early diagnosis of cancer of the uterus, we meet with one very serious difficulty which, probably more than any other, is responsible for the many deaths from this disease. I refer to the want of knowledge on the part of the public generally, as to the serious import of irregular blood-tinged vaginal discharges in women approaching the menopause. A very large proportion of patients with cancer of the uterus do not consult a physician until the malignant infiltration has advanced beyond cure. The disturbance in the early stage is so slight (just a slight leucorrhoea streaked with blood occasionally) that the patient thinks it of no particular significance and neglects to have any investigation until too late.

Whenever an occasional streak of blood or spot of blood appears in a leucorrhoeal discharge, particularly in a woman approaching forty or older, an examination is urgently required, in order to determine certainly whether or not there is beginning cancer in the cervix or body of the uterus. Such women should seek medical advice at once, that the cause of the blood-streak may be determined without delay. Education of the public in this matter is urgently needed and if carried on patiently and persistently and judiciously, will save thousands of women from death by uterine cancer. However, as I remarked when speaking on this subject two years ago,* "The education of the public in this matter is an exceedingly hard task. Of course physicians, as individuals, can help by giving information to their patients. But there is a larger medium of publicity that should certainly be utilized in some way in a matter of such great importance to the public. I refer to the public press and periodicals. This, however, is a delicate matter and one for concerted action only on the part of the profession as a body, and not for individual action. This phase of the subject is being already considered in a practical way and it is hoped that at the next meeting of the American Medical Association the matter will be thoroughly discussed and some definite and effective steps taken for the general dissemination of this much-needed information."

The Report† of the special committee appointed by the American Medical Association to consider this matter should be read by every physician, and the information contained therein should be disseminated in every practicable way.

That much good can be accomplished by a systematic and sustained fight in this direction is shown by the results in East Prussia.

Winter, aided by the professional, sociologic and governmental conditions there existing, carried on a most successful campaign against this disease. The report of the first year's work showed, among other things: (a) that the proportion of carcinoma patients who consulted a physician within three months after the appearance of symptoms, was raised from 32 per cent to 57 per cent; (b) that the proportion of patients operated on within two weeks after the first consultation, increased from 78 per cent to 90 per cent; and (c) that the operability in patients seeking treatment was raised from 62 per cent to 74 per cent.

TREATMENT

For purposes of treatment, the cases of carcinoma of the cervix are divided into two classes—operable and inoperable.

OPERABLE CASES.

This class comprises, theoretically, those cases in which the malignant disease is still limited to tissues that admit of complete removal. Practically, it comprises those cases in which there is a chance, even a small chance, that the carcinoma is limited to the tissues mentioned and in which the patient is in condition, or can be put in condition, to stand the radical operation with reasonable safety. By "radical operation" I do not refer to any particular form of operation, but to any operation that removes all the tissues likely to be involved in that particular case.

As to what tissues may be removed, by those skilled in pelvic work, that is well known. The removal of the uterus is the least that is to be done. In selected cases, the lower part of one or both ureters may be removed, or a part or the whole of the bladder, or a part or the whole of the rectum. Also, the pelvic connective tissue generally with its contained lymphatic vessels and glands, may be cleared out to the soft structures of the pelvic wall, and the enlarged lymphatic glands about the illiac vessels may be extirpated. I am not stating that any of these extreme measures should be employed in any case. I am only pointing out what *may* be done and the patient still survive, in selected cases.

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* The Promotion of Early Diagnosis in Malignant Disease of the Uterus, by H. S. Crossen, M.D. Medical Bulletin of Washington University, 1905.

† Journal of the American Medical Association, Dec. 8, 1906.

The question as to the *advisability* of such extensive operative work does not turn upon any question as to the possibility of removal of these structures, but upon the probability that carcinoma cells have simultaneously extended to other and inaccessible regions. Careful investigations in this direction have been made and many extensive operations have been carried out, but the question is not yet settled. However, results so far have not been such as to encourage operation in these extensive cases.

I feel that the lesson to be drawn from the work up to the present time, is that ordinarily recurrence is practically certain when the carcinomatous infiltration has extended so that it involves the bladder or the rectum or the outlaying lymphatic glands or the connective tissue around the ureters. When any of these structures are evidently involved, it is almost certain that there are scattered carcinoma cells in adjacent deeper and inaccessible tissues, hence these cases lie outside the operable class. There are exceptional cases, for example, of distinctly localized involvement in a slow-growing tumor, where it may be advisable to excise a portion of the bladder or ureter. But for the present, I feel that, ordinarily, to subject such a patient to an attempted radical operation is to cause her to pass through the dangers and the suffering of one of the most serious operations in surgery, without any reasonable hope of cure. If hysterectomy as a palliative measure, is desired, that is an entirely different proposition, and is carried out in a less extensive and less dangerous way.

In order to get a clear understanding as to the limit of the operable class, it is well to divide the course of carcinoma of the cervix into **three stages.** In the FIRST STAGE the disease is confined entirely to the uterus. Removal of the uterus will remove the entire process and effect a permanent cure. In the SECOND STAGE the carcinoma cells have gotten outside the uterus into the parametrium for a short distance—but still not beyond the reach of operation, provided the operation includes a wide removal of the connective tissue beside the uterus. In the THIRD STAGE there is evident involvement of the ureters or of the outlying connective tissue or of the bladder or of the rectum (with less evident involvement of deeper and inaccessible tissues), making complete removal of all involved tissue impossible.

The cases belonging to the first and second stages are **operable** as a general proposition. The cases in the third stage are **inoperable.**

How to Determine Operability.

How extensive is the carcinomatous infiltration—has it reached the third stage? That is the important question, for the answer determines whether or not the patient is to be subjected to radical operation.

To determine this absolutely in any case is impossible. It may, however, be determined approximately.

The signs upon which we must depend largely for determining it are the *induration* (occasioned by the infiltration of the tissues with carcinoma cells and opposing round cells) and the *fixation* of the uterus, which is present when the infiltration extends out to the pelvic wall.

Uterus Movable. If the uterus is freely movable operation is indicated.

Uterus Fixed. When the uterus is not movable, it is then necessary to determine whether the fixation of the organ is due to malignant infiltration or to inflammatory infiltration. If the fixation is due to malignant infiltration, operation is not indicated—the case has already passed into the third stage and palliative measures only are permissible. If the fixation is due to inflammatory infiltration, it is not a bar to operation.

The infiltration is **probably carcinomatous** if it is in the lower part of the broad ligament and directly continuous with the carcinomatous area of the cervix, if it is not tender and if there is no history of recent inflammatory trouble and no evidence of the same in the pelvis.

The inflammation is **probably only inflammatory** if there is a mass about one or both tubes (salpingitis), if the infiltration of the broad ligament is mostly in the upper part, if the bladder and rectal walls are not involved and if the patient gives a long history of inflammatory trouble and short history of cancer. In such a case, radical operation is indicated.

In order to determine approximately the amount of fixation and its probable character, it is often necessary in a doubtful case to employ **examination under anesthesia,** that deep palpation of all parts of the pelvis may be made. In such a case a deep recto-abdominal palpation of all the intra-pelvic structures, as well as the vagino-abdominal palpation, is usually advisable.

This examination, upon which the question of operation turns, is a very important procedure and requires much skill and much experience with this class of cases. If after a thorough examination, there is reasonable doubt as to the inoperability of the case, operation is indicated, for the patient is entitled to every chance possible in this otherwise fatal disease.

In these doubtful cases, the operation is begun as an **exploratory abdominal section.** After the abdomen is opened, the pelvis is thoroughly explored as to the infiltration and thickenings and their character, and as to the presence of evident glandular metastases. If this intra-peritoneal examination shows the tumor to be an operable one, the radical operation is carried out at once. If the tumor is found to be inoperable, the abdomen is closed, with or without the execution of one of the palliative measures mentioned later.

Operative Measures.

In the operable cases, what operation should be chosen? In order to answer this question intelligently, let us see just what the operation must accomplish. In most of the cases the disease has passed the first stage before the patient consults a physician. There is already carcinomatous infiltration of the connective tissue near the uterus—not sufficient, perhaps, to be appreciated to the examining finger, but amply sufficient to cause recurrence. This infiltration of the parametrium in practically all cases that come to operation, is the cause of the lamentable failure of the old vaginal hysterectomy and the old abdominal hysterectomy as a cure for cancer of the cervix uteri. Occasionally a case was met with in the first stage (simply a small ulcer on the vaginal portion of the cervix or a small nodule in the interior of the cervix), and in these cases the ordinary vaginal or abdominal hysterectomy removed all the involved tissue and resulted in cure. However, the general effect of these occasional good results was detrimental rather than otherwise, for they prolonged the reliance on these inadequate operations for the cure of the disease and postponed the devising of more effective operative measures.

When physicians began, after the lapse of some years, to count up the permanent cures from the operations mentioned, the results were most discouraging and disheartening. It was found that five per cent of cures was all that could be reasonably claimed. Some operators who had had many cases could not present one permanent cure, and a few lost all hope and claimed that the disease could not be cured by operation.

Careful investigation into the pathology of the disease brought out the cause of the failure of the operative measures then in vogue, and also pointed out the way to the methods which have proved successful and are proving more and more successful as they are used more and more in the early stage of the disease.

The cause of the failure of the former methods was found to be due to the extension of carcinoma cells into the parametrium in practically all cases when the patient comes for operation. It follows then logically and has been thoroughly established by extensive experience, that any operation that is to be used with a reasonable hope of success in carcinoma of cervix, must remove the infiltrated parametrium.

Any operation in which the line of excision lies close to the uterus, as in the old vaginal and abdominal hysterectomy for cancer, can not be successful except in certain rare cases where the disease is just beginning.

Jacobs, in 82 vaginal hysterectomies, saw recurrence in every one. Some series by the old vaginal or abdominal hysterectomy, show a few recoveries, past the five-year limit—but they are very few and far between. McMonigle reported 481 hysterectomies for cancer of the uterus, with 479 deaths from recurrence or from the operation.

Russel investigated the after condition of 48 cases of vaginal hysterectomy for cancer of the cervix, and found that almost invariably there was recurrence at the site of the scar, and not in the region of the lymphatic glands.

Another important point in regard to the operation is that if TRANSPLANTATION METASTASES are to be certainly avoided, the infiltration-area must not be cut into at any step of the operation—that is, it is not advisable to take out the uterus and then the infiltrated tissues around the uterus, but the whole infiltrated area, including uterus and parametrium, should be removed as one mass, the line of excision being everywhere placed in healthy tissue. When an incision is made through infiltrated tissue, cancer cells are liable to be carried into heal where they may grow. This has happened in several reported cases. Where an incision must be made through infiltrated tissue, it is safer to make it with the cautery, as that destroys all cells with which it comes in contact.

It must be kept in mind also that it is impossible to be certain in any case that the parametrium is not involved, no matter how early the case nor how perfectly normal the parametrium feels. Sampson has demonstrated conclusively that in some cases the carcinoma sends out, by direct growth, very fine prolongations into the parametrium and, in other cases, the carcinoma cells make short excursions into the lymph spaces of the parametrium. In such cases, there is no change in the parametrium appreciable to the examining finger.

It is evident then that any operation, whether vaginal or abdominal, that does not remove the parametrium, is not admissible as an operation for the cure of carcinoma of the cervix, except in certain rare cases.

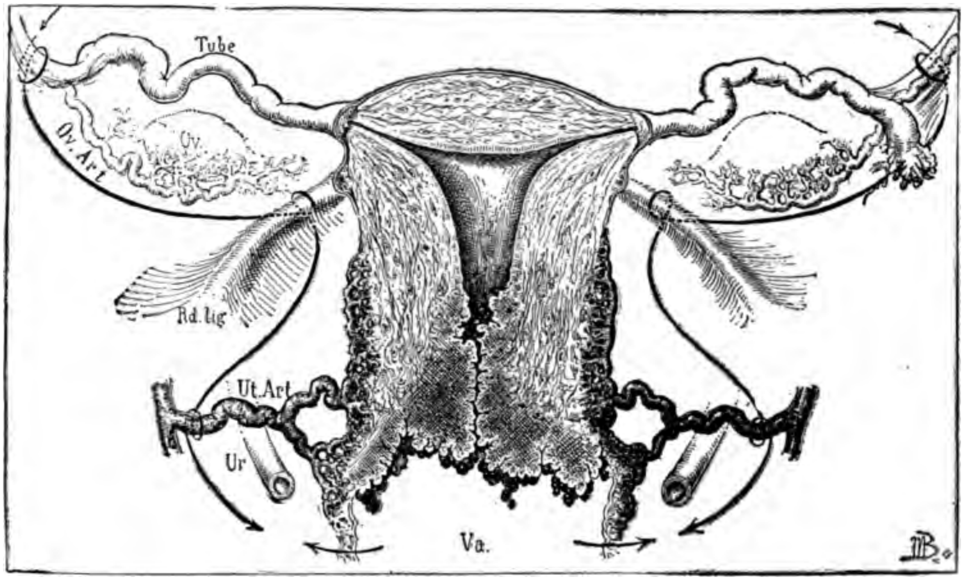

Fig. 622. The Essentials for any Radical Operation for Cancer of the Cervix Uteri. The excision of structures as here indicated must be carried out, whether the operation be abdominal or vaginal. (Kelly—*Operative Gynecology*.)

Any operation, whether vaginal or abdominal, that does **remove the parametrium,** is admissable in that it fulfills one of the essential requirements. Whether the work is done by way of the vagina or by way of the abdomen, is a matter of secondary importance. The essentials of the operation are shown in Fig. 622.

One point to be kept in mind is the removal of the uterus and parametrium intact. The broad ligament, including the tubes and ovaries, should of course be removed. It is in the lower part of the broad ligament, however, that the infiltration extends the farthest and that the principal operative difficulties are met with.

I route as a rule in operating for cancer of the cervix, but I have no serious objection to the vaginal operation when it includes the technique required for the removal of the parametrium. It will hardly be necessary for me to take up the advantages and disadvantages of the various operations proposed for this disease. I think it will be well, however, to give an idea of what removal of the parametrium means. A brief description of certain points of any one of the really radical operations will do this.

One of the best of the abdominal operations is that elaborated by Wertheim. The essential steps are given in the following quotation from the report of a case upon which I operated in 1903.* The patient was 33 years of age, the mother of five children and in good general health. The first symptom (some leucorrhoea, with prolonged menstrual flow) was noticed just eight months before the operation. Two months later a blood-streaked intermenstrual discharge began. The bleeding increased, pains and weakness came on and finally the patient, emaciated and weak from loss of blood, consulted Dr. H. H. Meyer, to see if there was any serious trouble. He examined her, made the diagnosis and referred her to me for operation.

"Examination revealed a large bleeding mass springing from the cervix and filling the upper part of the vagina. The mass was the size of a small fist and so obstructed the upper part of the vagina that it was impossible to make a satisfactory examination of the uterus and surrounding tissues. I advised that the patient submit to examination under anesthesia, when the obstructing mass could be cleared away and the extent of the parametrial involvement approximately determined.

"Under anesthesia it was found, after the projecting tumor-mass had been removed, that the whole cervix was involved and that the growth extended a short distance along the anterior vaginal wall. There was apparently some infiltration of the parametrium, particularly in the left side, but still the uterus was freely movable.

"It was a case for radical operation, with a fair chance of removing all of the involved tissue.

"A few days later I removed the uterus and parametrium by the Wertheim method. The steps in the operation were as follows:

"1. After the usual preparation for abdominal section, including saturation of the patient with fluid by giving her all the water she would take in small quantities at short intervals for two days before operation, the patient was anesthetized (ether) and placed in extreme Trendelenburg posture, the body being raised to an angel of almost 45 degrees.

"2. The abdominal cavity was opened and the incision enlarged until it extended from the umbilicus to just above the pubic joint. The fundus uteri was then seized with a heavy traction forceps and the organ drawn strongly upward and forward.

"3. The left side of the abdominal incision was then retracted, the small intestine and the sigmoid flexure were held out of the way and an incision was made in the peritoneum a trifle below the point where the left ureter enters the true pelvis.

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*The Wertheim Operation for Cancer of the Uterus; Report of a Case, by H. S. Crossen, M.D. St. Louis Medical Review, June, 1903.

"The ureter was easily found and the incision in the peritoneum over it was continued down along the course of the ureter to the point where it entered the broad ligament.

"4. Then a small silk ligature was passed from this incision around the left ovarian vessels and tied and the ligated structures were cut. The round ligament also was ligated and cut and then the clear peritoneum between the two ligatures was cut through, thus laying open the broad ligament. The broad ligament was then opened well down toward its lower part and the few bleeding points caught with forceps.

"5. Steps No. 3 and No. 4 were then carried out on the right side.

"6. The peritoneum at the vesico-uterine junction was then cut across and the bladder was separated from the uterus.

"7. Then a finger was passed along the right ureter from the point where it entered the broad ligament forward until the finger appeared in front of the ligament. In this maneuver the little pocket or archway, in which the ureter lies, was distinctly felt and served as a guide as the finger was forced forward. The finger, when through the ligament, had the ureter immediately below and in contact with it, while above were the uterine vessels and the parametrium surrounding them. The opening was then enlarged outward and the end of a ligature carrier was placed on the tip of the finger and as the finger was withdrawn the ligature carrier was made to follow it. The ligature was then tied a little beyond the ureter. When this tissue was cut through, the right ureter could be seen all the way from the pelvic brim to its point of entrance into the bladder. The parametrial tissue lying to the inner side of the ureter and below it, was then dissected away, care being taken not to free the ureter all the way around, as I wished to avoid any interference with its nutrition.

"The same procedure was then carried out on the left side. In the left side an enlarged lymphatic gland, the size of a bean, was found close to the uterine artery and somewhat to the outer side of the ureter. The ligature was, of course, placed outside of this gland.

"8. The uterus and vagina were then freed from the bladder and rectum and lateral tissues for about one-third of the distance down the vagina, the connective tissue lying beside the cervix and vagina being included in the mass to be removed.

"9. An assistant then cleansed the vagina, using first cotton-balls soaked in bichloride solution and then dry gauze repeatedly until the gauze was no longer soiled. Then a small piece of gauze was placed against the cervix and held there.

"10. From the abdominal cavity I then compressed the vagina with a right-angled L-forceps, the blades being applied just below the gauze and well below the lowest point of malignant infiltration. At the other side of the vagina another L-forceps was applied just below the first. Both of these forceps were clamped down hard, thus preventing any fluid from being squeezed past them.

"The vagina was then cut across below the forceps, the stump of the vagina being caught temporarily with three or four artery-forceps. The excised mass, with the L-forceps still attached, was removed from the abdomen. Catgut sutures were then applied about the open end of the vagina sufficient to stop the hemorrhage and narrow the opening.

"11. Search for enlarged glands was then made on each side, first about the iliac vessels and then forward along the pelvic wall to the obturator foramen, but no enlarged glands were found.

"12. After all the bleeding in the pelvis had been checked, a narrow strip of gauze was laid from each side of the pelvic cavity to the open vagina, the ends extending into the vagina. The peritoneum was closed over the pelvic cavity in the usual way, all raw surfaces being turned down and shut off from contact with the intestines. The abdominal incision was then closed with tier sutures of catgut and tension sutures of silkworm-gut.

"The operation was necessarily lengthy, but the patient stood it well. Convalescence was smooth and uneventful. The highest temperature was 100.8, recorded the second day after operation.

"There was no bladder paralysis, such as is sometimes present after this operation. The patient was catheterized for three days. On the fourth day she voided the urine and continued to do so afterward without disturbance.

"Beginning the fifth day, the gauze strips in the vagina and pelvis were pulled out a little each day until about the tenth day, when the remaining portions were taken out entirely.

"The specimen removed by operation was submitted to Dr. C. Fisch for microscopic examination for the purpose of determining, as far as possible, whether or not the malignant infiltration had extended beyond the line of incision.

"Dr. Fisch reported that the growth was an epithelioma and that ' in all places examined the operative separation has taken place in healthy tissue.'

"The point at which the cancer approached nearest to the margin of the removed mass was in the median line anteriorly, where the bladder was separated from the uterus.

"During the operation the bladder separated from the uterus without the least difficulty and there was no indication of involvement of the bladder wall. The enlarged lymph node in the neighborhood of the left ureter showed no cancer elements, but simply a marked hyperplasia. [The patient is now (4 years after the operation) in good health and with no evidence of recurrence.]

"As far as I know this is the first complete Wertheim operation for St. Louis.

"In 1900 Wertheim made his first report of this operation-method. The results so far obtained have been encouraging, though not enough time has as yet elapsed to count the patients as cured. Last September, at the International Gynecological Congress at Rome, Wertheim reported 120 cases in which he had operated by this method. Of the 120 patients, 24 died from the operation. In his first series of thirty cases, it had been two and a half to four years since operation. Of the eighteen of these who survived operation, five were not heard from, ten were in good health and in only three was there recurrence.

"The object of this operation is wide removal of the parametrium, and the points in the operation which seem particularly advantageous are:

"a. Exposure of the ureter at a point where it is easily found, i. e., at the pelvic brim.

"b. Incision of the peritoneum from this point, along the ureter to the base the broad ligament. This brings nearly all the pelvic portion of the ureter into view and locates accurately its point of entrance into the broad ligament.

"c. Introduction of the finger through the base of the broad ligament close along the ureter. This allows the ligature about the uterine vessels to be placed well away from the uterus, outside the ureter, with perfect safety and without the delay incident to catheterization of the ureters.

"d. The firm clamping of the vagina below the growth by two L-forceps, one below the other. This closes the vagina, which is to be cut across, and permits the mass to be removed through the abdomen without the possibility of any contaminating fluid being squeezed from the cervix.

"e. All the work is done from the abdomen, largely under the eye and without change of posture, thus doing away with delay from change of posture and the increased danger of sepsis necessarily attendant on the 'combined,' or vagino-abdominal operations.

"The contra-indications to this operation are:

"1. Obesity. When the patient is very stout, the thick abdominal wall and the pelvic fat interfere with the proper exposure and dissection of the parts.

"2. Any serious disease of the heart or lungs or kidneys or other organ that would render the patient probably unable to stand a long abdominal operation. In some of such cases a vaginal hysterectomy, including, when necessary, Schuchardt's incision beside the rectum, will give a fair chance of cure without unduly jeopardizing the patient's life. Much judgment as to choice of operation is required in these cases. A wide removal of tissue, such as we get in the Wertheim operation, is much to be desired. But in a poorly conditioned patient this wide removal of tissue may be purchased too dearly. A fair probability of complete removal and a live patient is better than a greater probability of complete removal and a dead patient.

"3. Cancerous infiltration extending beyond the ureters or involving the bladder or rectum. Such cases I do not consider suitable for radical operation. Of course, I am aware that some operators advise operation in these cases and remove the infiltrated portions of the affected organs (bladder or rectum). Sampson, of Johns Hopkins University, has adapted the Wertheim operation to these cases by extending the dissection outside the ureter and excising the involved portion of the ureter along with the main tumor.

"Such extensive operations are experimental as yet.

"I earnestly hope some procedure may be devised that will be efficient in these cases of immovable uterus.

"But until more hope can be held out than is justified by results up to the present time, I can not advise such a patient to submit to radical operation.

"There is, however, one class of patients with uterine cancer and extensive infiltration, rendering the uterus immovable. in which I urge operation, namely, those patients in which there is a probability or possibility that the parametrial infiltration is not malignant, but simply inflammatory. The broad ligament infiltration is more likely to be simply inflammatory if it is situated in the upper part of the ligament, if there is a mass about one or both tubes (salpingitis) and if there is a long history of inflammatory trouble and a short history of cancer.

"4. Beginning cancer of the body of the uterus. Ordinarily, in such cases, vaginal hysterectomy is preferable, because it is less dangerous, while at the same time permitting removal of all tissue likely to be involved.

"The same may probably be said of certain very early cases of cancer of the cervix, though that is still a mooted point.

"I wish to thank Dr. F. J. Taussig for assistance in the case reported tonight. Dr. Taussig recently worked with Wertheim and to him I am indebted for the details of the operation as carried out at the present time by that teacher."

Wertheim in his last report (1912) had operated by this method on 675 cases of cancer of the cervix. Of the 380 patients operated more than five years ago, 160 were well and free from cancer. There was a permanent cure in 43 per cent of all patients subjected to operation and in 53 per cent of the patients surviving operation. The primary mortality of the operation was reduced from 20 per cent in the first 120 to 9 per cent in the last 100.

All together during these fourteen years (1898 to 1912), 1,430 cases of cancer of the cervix were examined in Wertheim's clinic. 675 were operated. 70 refused operation and 684 were inoperable—giving 50 per cent operability. In deciding as to operability, many points must be considered—the extent of parametrial infiltration, the fixation of the bladder and rectum, enlarged glands that may be felt, the general condition of the patient especially the condition of the heart and of the blood and the presence or absence of obesity.

One distinct advantage of the abdominal operation, is the better opportunity it gives for accurate determination of the extent of the carcinomatous involvement before beginning the operation proper. After the abdomen is open, the pelvis may be thoroughly explored, and the advisability of doing a radical operation determined before beginning the same.

In some cases that are apparently well suited for radical operation, this intraperitoneal examination shows that such an operation would be utterly useless and hat only palliative measures are permissible. On the other hand, in apparently advanced cases, this thorough exposure of the pelvic interior may show that much of the supposed extensive malignant infiltration is only an inflammatory mass or a fibroid or other non-malignant growth, and that radical operation is fully justified.

Recurrence after operation. The frequency of recurrence has been mentioned. The facts show that the prognosis must in every case be very guarded, no matter how early or how thorough the operation. A recurrence may be a local recurrence (in or near the scar of the operation) or lymph-gland recurrence (in some of the lymph glands in the pelvis or lower abdomen) or a distant metastatic recurrence (in some organ to which cancer cells have been carried by the blood-stream). A local recurrence is amenable to treatment. The preferable treatment, usually, is thorough and wide excision with the thermo-cautery. As an additional precaution, X-ray treatment may be used following the excision. The diagnosis of recurrence rests on the same symptoms and signs as the diagnosis of the primary growth. Lymph-gland metastasis is not amenable to cautery treatment, but the pain may frequently be considerably relieved by palliative measures, including

X-ray treatment, electricity as applied for the relief of pain, and the generai and local measures for diminishing pelvic congestion. The patient should be given morphine or other preparation of opium in sufficient quantities to prevent suffering.

Carcinoma Complicating Pregnancy.

Pregnancy may take place in a women with beginning carcinoma of the cervix or carcinoma may develop after impregnation. In either case the effect of the pregnancy is to markedly hasten the growth of the cancer. Carcinoma complicating pregnancy is rare, being found only three times in a collective series of 54,833 labor cases. The treatment depends on whether or not the carcinoma is operable.

Carcinoma OPERABLE. When there is a fair chance of cure by radical operation, that should be carried out at once, "irrespective of the viability of the fetus."

Carcinoma INOPERABLE. When the carcinoma of the cervix is inoperable, the life of the child is the thing of principal moment, and the treatment should be palliative and directed toward preserving the life of the mother until the child has advanced far enough to have good chance of independent existence. The details of the treatment and the time to interfere in an operative way must be determined by a careful study of the conditions present and the probable developments in each case.

INOPERABLE CASES

In the third stage, only palliative measures are permissible. The palliative measures are as follows:

1. **Tonics and Stimulants.** Give tonics and stimulants as indicated, such as iron, strychnia, etc. Administer sedatives in sufficient quantity to give rest—first the milder sedatives (such as bromides and phenacetin) and later morphine. The cases usually come to opium in some form sooner or later and, though it should be used only when necessary, it should be used as freely as required to relieve the pain and make the patient as comfortable as possible in her last months of life. Give laxatives as freely as necessary to prevent constipation from the opium. Regular and thorough bowel movements will save the patient much discomfort. Attention to nourishment, as in other wasting diseases is of course important.

2. **Ergot** and other uterine astringents lessen the amount of blood in the uterus, and in some cases seem to diminish the swelling and pain and hemorrhage. They are given the same as recommended for bleeding in fibromyoma.

3. **Douches.** Antiseptic and astringent douches constitute an important part of the palliative treatment. Hot bichloride douches (1-5000) wash away the vaginal discharge, diminish decomposition in the vagina and by the heat diminish the pain. These may be given one to four times daily, depending on the amount of discharge. If the odor persists in spite of these douches, lysol may be used (two teaspoonfuls to the quart of water). This is usually very effective in checking the odor, but must be used sufficiently often to keep the vagina approximately clean, for the odor depends on decomposition. Weak formol (1-5000 to 1-2000)

makes an excellent douche in these cases. Begin with the weaker solution and advance to the stronger, if it does not cause smarting.

If there is a marked hemorrhagic tendency, the astringent douche of alum and zinc sulphate (see Formulæ) or a tannic acid douche (see Formulæ) is indicated.

4. Applications. On account of the discharge or hemorrhage, strong astringent applications are often needed, such as tannic acid and xeroform (half and half) or liq. ferri subsulphatis. The uterus is exposed with the speculum and the application made to the affected area.

The astringent powders are effective if held in place by a tampon. Iodoform and tannic acid, equal parts, held in place by a tampon, make a splendid astringent dressing for this purpose. When the odor is marked, iodoform and charcoal are useful.

By means of the tampon capsules (see page 327), the desired powder may be applied by the patient at home as often as required after a douche. She is directed to fill the top of the capsule with the powder before introducing it.

Formol (25% to 50%) applied as a cauterizing and hardening agent to the cancerous tissue tends to check the bleeding and foul discharge.

Zinc chloride also is an effective cauterant in these cases and has been long used for the purpose.

Many other cauterant and hardening agents have been used from time to time with benefit.

In the use of all these agents care must be taken to prevent cauterization of the vaginal wall. Of course, these agents are much more effective when used immediately after a thorough curetting-away of the broken-down bleeding tissue. The principal beneficial effect is then due to the curetment. But when the area is curetted under anesthesia I think the best application to make immediately afterward, is the actual cautery, as explained below. The other applications may be used with benefit later.

5. Curetment followed by **cauterization** of the affected area, constitutes one of the most beneficial of the palliative measures. In some exceptional cases this may be carried out satisfactorily without an anesthetic.

Under anesthesia, however, the curetment may be made much more thorough, and ragged portions of cervix and vagina may be clipped off. The cauterization also with the Paquelin or electric-cautery, is made much more thorough—the walls of the cavity being thoroughly charred for quite a distance below the surface, care being exercised, of course, not to cause deep sloughing toward the bladder or rectum, if adherent. After the baking of the surfaces, the cavity is packed with the iodoform gauze, and the vagina is packed with the same. The effect of the curetment and cauterization under anesthesia is much more marked than without anesthesia. In doubtful cases, where an examination under anesthesia is to be made to determine the advisability of a radical operation, it is well to have the things ready so that if the carcinoma is found to be an inoperable one, palliative curetment may be at once carried out.

The improvement from a thorough curetment and cauterization is usually marked. The constant discharge and loss of blood is checked temporarily and the patient picks up considerably, sometimes becoming well enough to take up work formerly dropped. Repeated cauterization, as indicated by the recurrence of bleeding or foul discharge, is very beneficial. In some cases the extensive scar tissue formation from repeated cauterization exercises a remarkable inhibitory effect on the cancer—checking its growth and, in rare cases, even causing retrogression. At the St. Louis meeting of the American Medical Association (June, 1910) a number of cases were reported in which this apparent retrogression was so marked that the supposed inoperable carcinoma of the cervix became, after repeated cauterization, operable and was then removed by radical operation, with permanent cure. While such a result is very exceptional, yet the possibility of its occurrence must be kept in mind and should encourage careful and persistent treatment

6. Curetment followed by acetone applications has given excellent results. It was proposed by Dr. G. Gellhorn. It has the distinct advantage that, in suitable cases, the foul odor and the bleeding may be kept away without the repeated anesthesia necessary where dependence is placed on curetment and cauterization at intervals. It is applied as follows: With a sharp curet all the broken down tissue is cleared out, leaving a cavity with firm walls. This thorough curetment is best made under general anesthesia. The cavity is sponged clear of blood and debris, and then quickly packed with gauze wrung out of very hot water. This tends to check the oozing and is to be held firmly in place while the patient's hips are elevated to the Trendelenburg posture in preparation for the acetone application. Then the vulva and vaginal walls are coated with vaseline, the hot packing is removed and a tubular speculum large enough to surround the greater part of the raw cavity is introduced and pressed firmly against the cervix. The pure acetone is then poured into the speculum (through a funnel or simply from the bottle) in sufficient quantity to fill the end of the speculum for an inch or so. Keep the acetone thus in contact with the raw surface for thirty minutes. Then the acetone is removed by soaking it up with cotton in forceps or by lowering the table and allowing it to run out of the speculum. After the cavity is dried with cotton, a tampon is introduced through the speculum and held in place as the speculum is withdrawn. This tampon may be left in place for several hours, to absorb any acetone left and thus prevent irritation of the vaginal wall. The coating of the vulvar and vaginal surfaces with vaseline is to prevent irritation by stray drops of the acetone. The acetone application, without curetment, is to be repeated twice weekly until the cavity is well contracted, and after that occasionally as needed to prevent bleeding and odor. The application may last 30 to 45 minutes—the longer the better as a rule. The speculum is to be held in place all this time. Usually the patient can steady the speculum in place after having been shown how to do so.

7. Partial or complete vaginal hysterectomy as a palliative measure is of service in suitable cases. By this means a large part of the cancerous mass is removed, the discharge and hemorrhage are checked, pressure in the pelvis is relieved and the patient is made more comfortable for several months and sometimes longer.

Partial extirpation by the cautery, after the method of Byrne, is the preferable plan usually. A large part of the cervix, with as much of the body as seems advisable, is extirpated by the cautery and the remaining surfaces are thoroughly baked. The effect of the heat seems to have some influence extending a considerable distance beyond the cauterized tissues, as indicated by the long freedom from recurrence on the cauterized surface, though the deeper portions of the infiltration may continue to grow. When applied thoroughly in a way to secure satisfactory results, amputation is almost as formidable an operation as vaginal hysterectomy and should be used only when everything is at hand to meet the dangers and difficulties that may arise.

8. **Ligation of the ovarian arteries** and other easily accessible arteries supplying the region of the tumor, together with the removal of the adnexa, may be made use of in some cases. For example, where there has been an exploratory abdominal section and the carcinoma is found inoperable, the vessels mentioned may be ligated to diminish the blood supply and retard the growth. The effect as a rule is not very marked. Kosler reports several cases treated by ligation. There was some temporary improvement, but the hemorrhage returned in a short time.

9. **X-Ray Treatment.** This relieves the pain and bleeding in some cases, but the high claims as to curative results in cases of carcinoma of the cervix have not been sustained. It may be used as a palliative measure in inoperable cases, but even then it is not likely to produce as good results as a partial excision of the uterus by cautery or even as a thorough curetment and cauterization of the cavity. It is still on trial, its exact status as a palliative measure having not yet been thoroughly established.

The effect of the Finsen Light seems to be less than that of the X-Ray. The effect of Radium treatment is practically nil.

10. **Interstitial Injections.** Injections of various substances into the cancerous mass to cause sloughing is sometimes used with benefit. It is an uncertain method, however, and it is very questionable if as much can be accomplished as by a thorough curetment and cauterization. The same may be said of various substances used for the dissolving of fungus cancerous tissue.

11. **Toxins.** Much work has been done with the idea of developing a toxin or antitoxin or serum that would check the growth of malignant tumors, but so far nothing satisfactory has been created. Coley's toxin (made from a culture of the streptococcus and the bacillus prodigious) has produced occasional beneficial effects, principally in sarcoma. But the results in carcinoma have not been such as make its use worth while. Doyen's cancer serum proved a failure. It is to be hoped that the present wave of investigation into the causes of malignant disease will produce something of real value.

CARCINOMA OF THE CORPUS UTERI.

Adeno-carcinoma is the variety usually found here. It begins in the endometrium, consequently the tumor tissue is accessible to the curet at a very early stage. The growth is for a long time confined to the tissues immediately about the uterine cavity, the extension to the periuterine tissue being slow usually in carcinoma of the corpus uteri—hence the chance of cure is

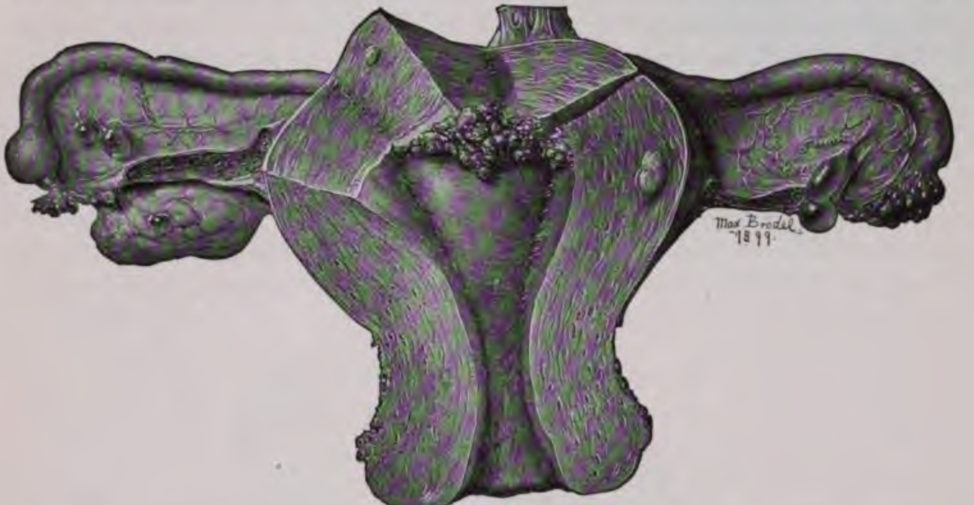


Fig. 623. Beginning Carcinoma of the Corpus Uteri. There is no external sign of the growth at this stage, except an occasional streak of blood in the leucorrhoeal discharge. The diagnosis must be made by curetment. (Cullen—*Cancer of the Uterus.*)

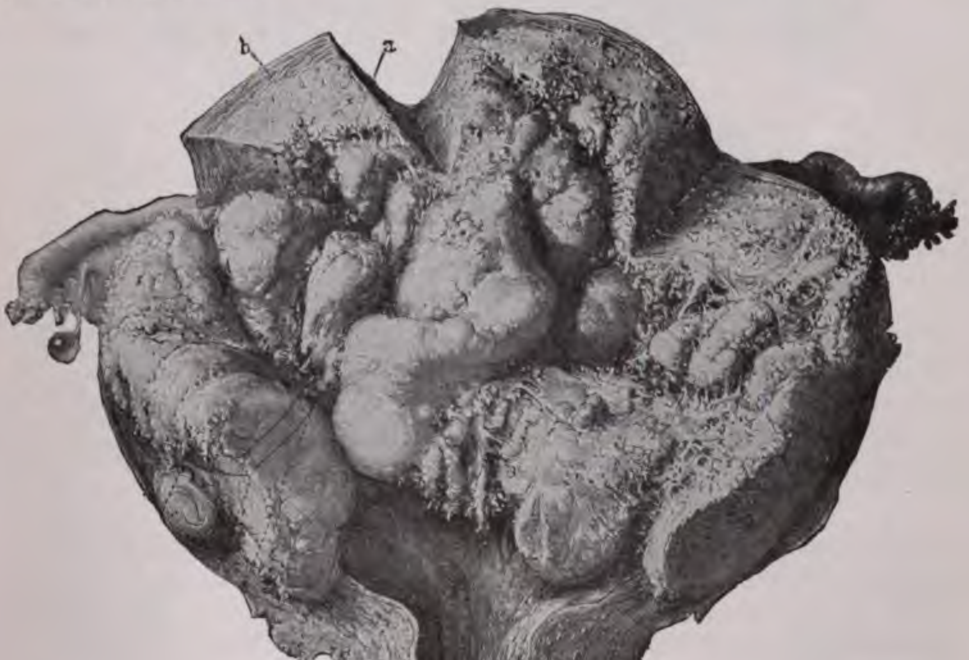


Fig. 624. Adeno-carcinoma of the Corpus Uteri in an advanced stage. (Cullen—*Cancer of the Uterus.*)

much better. Cancers of the corpus uteri constitute a distinct class, having a better prognosis than cancer of the cervix uteri, and requiring as a rule less extensive operative treatment. A carcinoma of the corpus uteri, still in an early stage, is shown in Fig. 623, and one far advanced is shown in Fig. 624.

Chorio-epithelioma is a peculiar form of carcinoma arising from the fetal cells covering the chronic villi. A striking feature is the early penetration of blood-vessels, with resulting metastases to distant organs, which makes it an exceedingly fatal growth, even when removed comparatively early. Care should be taken to exclude it whenever there is persistent bleeding coming on some weeks or months after confinement or miscarriage. It is especially liable to occur following hydatidiform mole. Such was the history of the specimen shown in Fig. 625. This patient was brought to me some months after the expulsion of a large hydatidiform mole. The immediate cause of the consultation was repeated uterine hemorrhage, difficult to control. Curettage gave tissue that showed malignant disease of the corpus uteri. I then did a hysterectomy, and sectioning of the removed uterus showed a typical chorio-epithelioma.

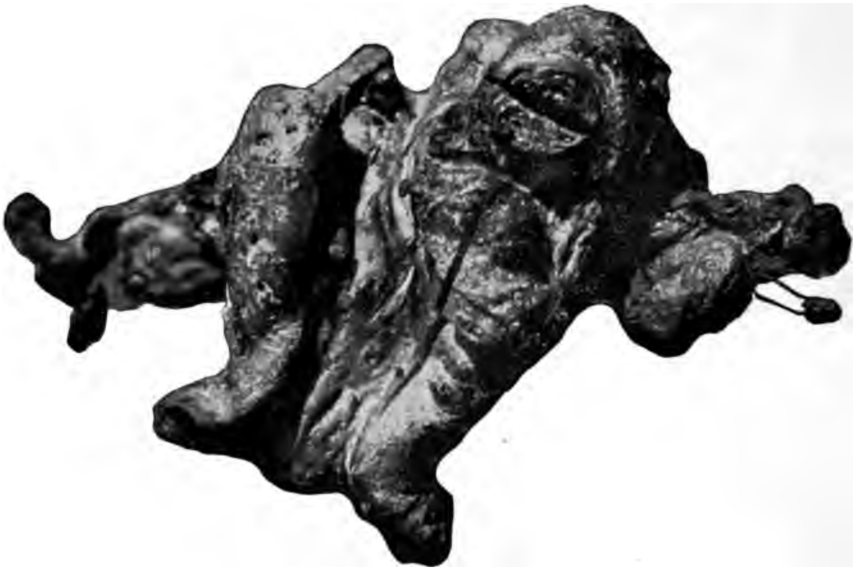


Fig. 625. A Chorio-epithelioma of the Uterus. The uterus, which is about one-half larger than normal, has been opened from the posterior surface and spread out. Projecting from the endometrial surface on the right side near the fundus is a nodule which has been incised. It is the size of a walnut and extends into the wall almost to the peritoneum. Sections from this nodule show the characteristic structure of chorio-epithelioma. The fact that in chorio-epithelioma there is early erosion of the blood vessels and early metastasis to distant organs should in nowise discourage operation in this class of tumors, but should simply stimulate us to greater endeavor to make the diagnosis at the earliest possible moment. This patient was heard from more than five years after the operation, and was still well and with no evidence of recurrence.

Malignant adenoma and **endothelioma** are rare forms of malignant disease, which do not require special description here.

Symptoms, Diagnosis, Treatment.

The **symptoms** and **diagnosis** are much the same as for carcinoma of the cervix, and are presented in detail on pages 670 to 672. In the early stage a positive diagnosis can be made only by curettage and microscopic examination of the curettings. Chronic endometritis, particularly that associated with senile changes, is the affection with which it is most likely to be confounded. A very practical question is, "In what cases is it advisable to do curettage in order to exclude malignant disease of corpus uteri?" In all cases in which the bloody uterine discharge persists in spite of treatment for endometritis. When a patient, near the menopause, comes complaining of irregular menstruation or irregular bloody discharge, and examination shows no trouble with the cervix, no uterine fibroid and no periuterine disease, I assume that the bleeding is due either to chronic endometritis or to beginning malignant disease of the endometrium. If the cervix is somewhat open, I try, in the office examination, to secure some tissue from within the uterus. If this is not practical and the probabilities are in favor of endometritis, I put the patient on the ergotin capsule (see Formulae) and watch for two or three weeks. If the bloody discharge ceases, that points to endometritis and the treatment is continued. If the bloody discharge persists or if it returns after cessation, then I insist on curettage. In such a case, if tissue showing positive evidence of malignancy can be secured in the office examination, it obviates double anesthesia. On the other hand, malignant disease ordinarily can not be excluded except by a thorough curettage under anesthesia, which means systematic removal of endometrial tissue from all parts of the uterine cavity. Another important point is that all the curettings must be preserved and subjected to the microscopic examination. For points in regard to collecting and transmitting curettings see page 96.

The **treatment** for carcinoma of the corpus uteri is complete hysterectomy at once. When the disease is discovered early, ordinary hysterectomy, either abdominal or vaginal, will practically always suffice to remove all involved tissue. In the advanced cases removal of more or less of the parametrium and other periuterine tissues is required.

SARCOMA OF THE UTERUS.

A **sarcoma** is a malignant growth arising from connective tissue or connective tissue derivatives. The cause of sarcoma, like that of carcinoma, is not known. About the same theories have been brought forward to account for it. Sarcoma differs from carcinoma in that it may occur at any age (though more frequent from the age of 40 to 60), and furthermore it is not especially associated with child-bearing.

Sarcoma may appear as a general infiltration of the endometrium or as a distinct tumor. By edematous change, grape-like masses may form, either in sarcoma of the cervix (Fig. 311) or in sarcoma of the body of uterus. The sarcomata beginning in the endometrium are generally of the round-cell variety. Sarcomata of the muscular part of the uterine wall usually come from sarcomatous degeneration of fibromyomata.

The sarcomata grow rapidly or slowly, depending on the character of the particular tumor. They infiltrate adjacent tissues like the carcinomata and cause death in about the same time.

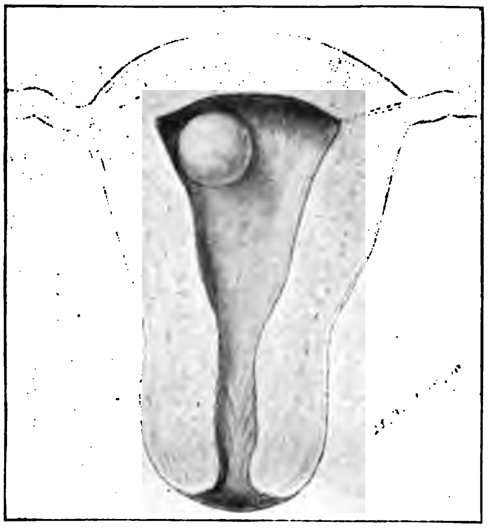


Fig. 626. Beginning Sarcoma of the Corpus Uteri. At this Stage there is no external evidence, except blood streaks in the discharge. The diagnosis must be made by curetment. (Kelly—*Operative Gynecology*.)

The **symptoms, diagnosis** and **treatment** of sarcoma of the uterus are practically the same as for carcinoma. A beginning sarcoma is shown in Fig. 626, and one more advanced in Fig. 627. It sometimes occurs in children. Occasionally it appears in the form of a grape-like mass attached to the cervix, as shown in Fig. 311. A pediculated sarcoma projecting into the vagina is shown in Fig. 310. A sarcoma originating in a fibroid is shown in Figs. 613 and 614.

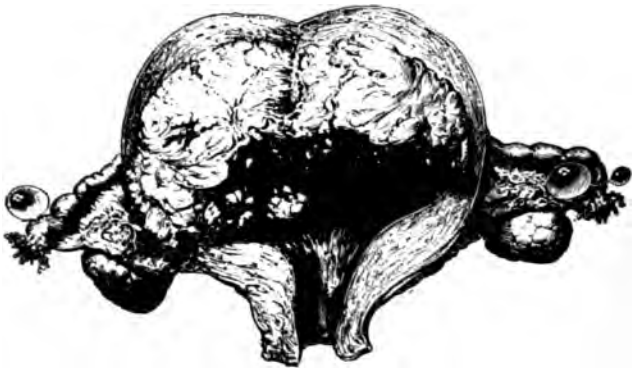


Fig. 627. Advanced Sarcoma of the Corpus Uteri. (Kelly—*Operative Gynecology*.)

CHAPTER X.

PELVIC INFLAMMATION.

Pelvic inflammation is the term applied to inflammation in the pelvis outside the uterus. The inflammatory process may be located in the Fallopian tubes, in which case it is called "salpingitis," or it may be in the ovary, in which case it is called "oophoritis," or in the peritoneum, where it is known as "pelvic peritonitis," or it may be in the connective tissue, where it constitutes "pelvic cellulitis." The cause of these various forms of inflammation is the same—viz., infection—the symptoms are much the same, the treatment is in many respects the same, and two or three of the lesions are usually associated—in some cases so intimately associated that it is difficult to determine which is the most important. Consequently, from a practical standpoint, it is best to consider all these lesions together under the one comprehensive term "pelvic inflammation."

Before taking up the disease proper, I wish to call attention to some points in the anatomy of the structures involved.

POINTS IN ANATOMY

Of Fallopian Tubes, Pelvic Peritoneum, Pelvic Connective Tissue.

FALLOPIAN TUBES.

The Fallopian tubes, or oviducts, are two small muscular tubes, one on either side, which extend from the fundus uteri outward in the upper part of the broad ligament toward the pelvic wall (Figs. 4, 5). Each tube has a small central cavity extending its whole length (Fig. 531). The inner end of this cavity communicates with the uterine cavity and the outer end opens into the peritoneal cavity. Thus there is a direct opening from the outside of the body into the great peritoneal sac, through the vagina, uterus and Fallopian tubes (Fig. 628). This is why infection of the genital tract in a woman leads to peritonitis so much more frequently than infection of the genital tract in a man—the infection in the vagina simply extending along this mucous tract directly into the peritoneal cavity.

The tubes vary considerably in size and somewhat in shape in different individuals. The length of each tube is three to five inches and the direction is outward, backward, downward and inward—somewhat resembling a shepherd's crook and partly surrounding the ovary (Fig. 4).

That portion of the tube lying in the uterine wall is known as the **interstitial portion** or uterine portion. It has a very narrow lumen (Fig. 531). That **portion of the tube extending from the margin of the uterus to the beginning** of the curve is called **isthmus.** It is about the diameter of a slate pencil a is firm. The lumen is small, but becomes gradually larger toward the out end. The outer curved dilated portion of the tube is known as the **ampul** It is about the size of a lead pencil and the lumen also is much larger th that of the isthmus (Fig. 531). The outer end of the tube is known as t

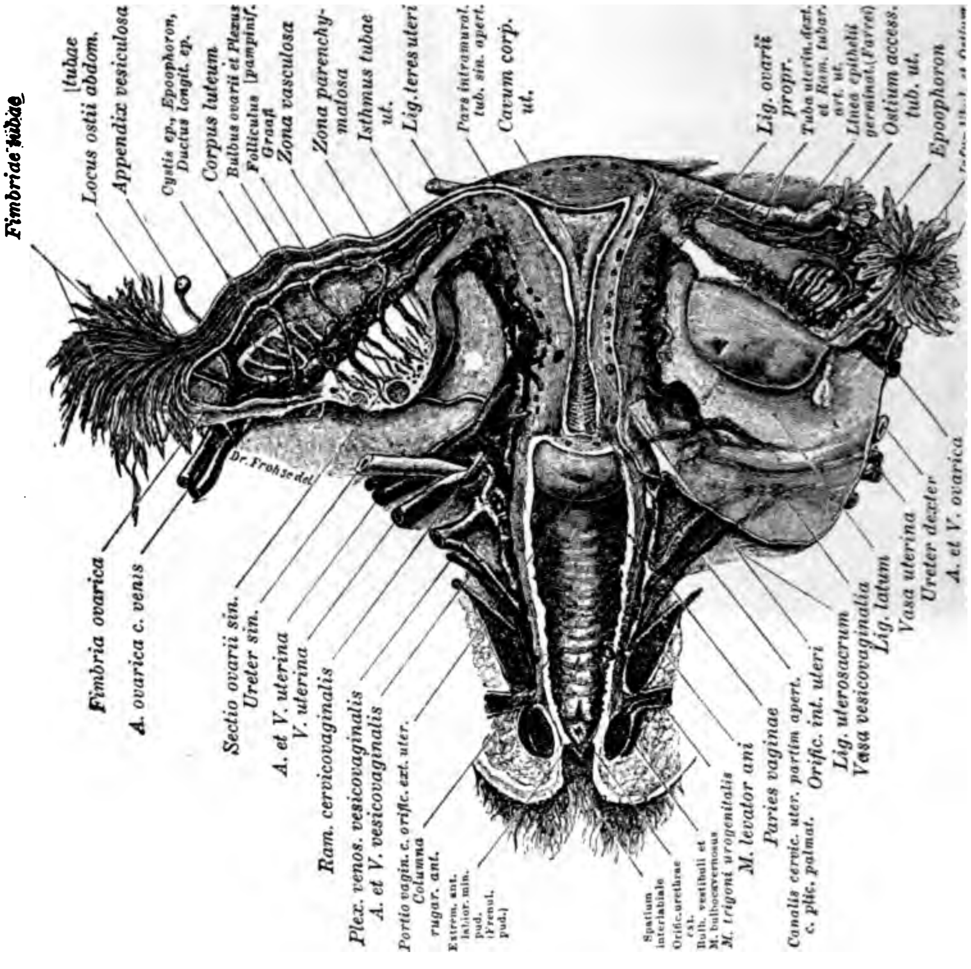


Fig. 628. A Diagrammatic Section of the Genital Canal. Notice the continuous opening from the vul through the vagina, uterus and Fallopian tubes to the peritoneal cavity. This is the reason genital infecti extends to the peritoneal cavity so much more frequently in women than in men. (Waldeyer—*Das Becken.*)

fimbriated extremity or the infundibulum. This consists of a funnel-shap expansion surrounded by a fringe of slender, finger-like processes call "fimbriae." One of these extends to the ovary and is attached there and called the "ovarian fimbria."

In structure the wall of the tube is largely muscular, resembling the uteru

In fact it is derived from the same fetal organ as the uterus (Fig. 704). The tube lies beneath the peritoneum of the upper margin of the broad ligament and its wall presents three layers—peritoneal, muscular and mucous.

The **peritoneal layer** does not differ materially from peritoneum elsewhere. It is composed of flat endothelial cells lying on a basis of firm connective tissue. Immediately beneath the peritoneum is a layer of connective tissue sometimes called the subperitoneal layer. In this run blood vessels and lymphatics. The interstitial portion of the tube has, of course, no peritoneal layer, as the muscular tissue of the tube is in immediate contact with the muscular tissue of the wall of the uterus.

The **muscular layer** of the tube is composed of involuntary muscular tissue, disposed in two strata, an outer longitudinal and an inner circular. Both these strata are continuous, with similar muscular strata in the uterus. The internal stratum sends prolongations of muscular tissue into the four principal folds of the mucosa. The muscular layer is thinner at the abdominal end than at the uterine portion of the tube. The increased thickness of the wall at the abdominal end of the tube is due to the many folds of mucosa.

The **mucous layer** of the tube, like the uterine mucosa, is placed directly upon the muscular layer—there is no intervening submucosa. The surface of the mucous membrane is formed of a layer of ciliated cylindrical cells. The cells are somewhat taller than those lining the body of the uterus and not so tall as those lining the cervix uteri. Beneath the epithelial layer the mucosa is composed of "stroma cells," very much like those found in the uterus, except slightly smaller. Between the stroma-cells is a delicate connective-tissue framework. There are found also capillary blood vessels and small lymph channels.

There are no glands in the tubal mucous membrane. The depressions which look like glands are due simply to the folds of the mucous membrane. As there are no glands in the tube, there can be no mucus secretion, such as takes place in the uterus. The fluid by which the tube is distended in certain pathological conditions is inflammatory exudate and not glandular secretion.

The mucous membrane is much folded longitudinally (Fig. 531). There are four principal folds into which prolongations of the muscular tissue take place. There is no muscular tissue in the many smaller folds. In the interstitial portion and in the isthmus the folds are few and simply longitudinal (Fig. 629), but in the outer portion of the tube (the ampulla) they become very complex and fill the tube with folds extending in every direction (Fig. 630)—so much so that it is sometimes difficult to decide which is the main canal of the tube. The cilia of the epithelium project into the lumen of the tube and by their movement toward the uterus aid the passage of the ovum in that direction. In the presence of this delicate and much-folded mucous membrane, inflammation in the tube quickly causes serious changes. The cilia are lost, the folds become adherent, pockets of serum or pus form, and the picture of the tubal interior may be so changed as to be hardly recognizable.

Vessels and Nerves. The blood supply of the tube comes from the ovarian artery through several small branches. The uterine artery helps to supply the tube in some cases. The veins open into the pampiniform or ovarian

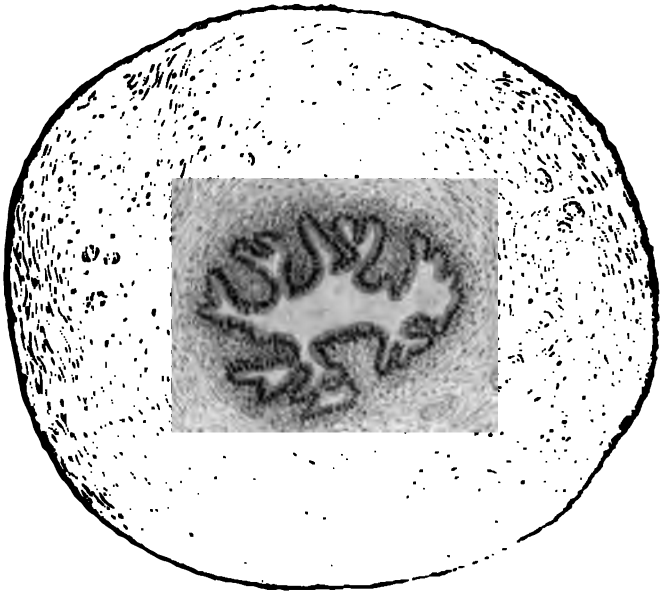
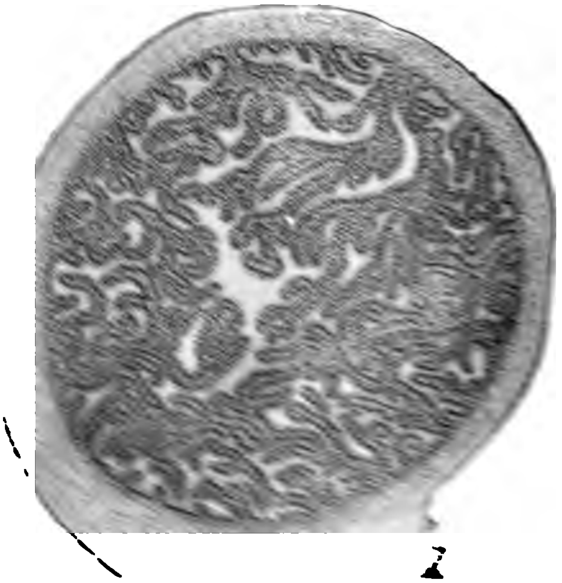


Fig. [illegible].—Cross-Section of a Normal Fallopian Tube near the Uterine End. [illegible] After Beyea—Dis-[illegible]

plexus and thus into the broad ligament. The lymphatics join with those of the ovary. The nerve supply comes from the pelvic plexus of each side.



[illegible]

Physiology. The primary function of the Fallopian tube of each side is to convey ova from the corresponding ovary to the uterus. It is supposed to require several days for the ovum to pass the length of the tube. In addition to this, the tube conveys spermatozoa in the opposite direction, and it is usually in the tube that the union of the ovum and the spermatozoon takes place.

The mechanism by which the ovum is carried from the ovary into the tube is complicated. After the Graafian follicle in the ovary bursts, the liquor folliculi causes the ovum to adhere slightly to the surface of the ovary. Some of the fimbriae are in contact with the surface of the ovary and, when an ovum comes in contact with one of them, the cilia carry it towards the entrance of the tube. Besides this action of the cilia directly on the ovum, the constant movement of all the cilia causes a slight current of peritoneal fluid toward the interior of the tube from all directions. This helps to carry the ovum or any other small particles into the tube. The fact that there is such a current towards the interior of the tube has been demonstrated by the injection into the pelvic peritoneal cavity of animals of numerous small insoluble particles, which were found later in the tubes.

It has been suggested that the fimbriated extremity of the tube grasps the ovary when an ovum is discharged, but this has not been proven.

Normal Changes in the Tube.

In studying the anatomy of the uterus it was found that that organ, particularly the mucosa, was subject to normal changes under three conditions—namely, menstruation, pregnancy and the menopause. Now, in the Fallopian tube also, we find normal changes, due to menstruation, to pregnancy and to the menopause. Speaking generally, it may be said that these changes are like those occurring in the uterus, but less marked.

During **menstruation** there is congestion of the tube and possibly a slight effusion of blood into the interior of the tube. If this does take place, however, it is slight and is of no importance when considering the source of the menstrual blood. Practically all of the menstrual blood comes from the uterus. In a case of removal of the uterus by operation and the fastening of one of the tubes in the vaginal incision, a slight bloody flow was noticed at the menstrual periods for a few months. But such tubes are pathologic, and it is an open question whether or not a bloody flow would take place from a normal tube.

In **pregnancy** (normal pregnancy, not tubal pregnancy) the tube wall and mucous membrane become thickened and the folds enlarged. The vessels also become larger, especially the veins and lymphatics. After confinement the tube undergoes involution along with the uterus.

After the **menopause** the tube shows certain senile changes. There is disappearance of the cilia, diminution in the size of the tube, shrinking of the connective tissue and shrinking of the mucosal folds. The tube becomes smaller and firmer, and is no longer a functionating structure.

PELVIC PERITONEUM.

The pelvic peritoneum is that portion of the wall of the peritoneal sac which lies in the pelvis. It is attached more or less closely to the pelvic organs and its free surface comes in contact with the peritoneal surface of the intestines as they move about in the lower abdomen. To get an idea of the distribution of the peritoneum in the pelvis, imagine a piece of thin cloth laid over the pelvic organs and tucked down firmly around them (Fig. 550).

Starting from the abdominal wall, the peritoneum passes onto the bladder, and from the posterior surface of the bladder to the uterus (Fig. 3). The height of the abdomino-vesical fold of peritoneum varies much with the varying size of the bladder, which fact is of much importance in surgical work. The distance to which the peritoneum extends down the anterior surface of the uterus varies considerably in different persons. Usually it extends to the level of the internal os and is about an inch above the anterior vaginal fornix. When the bladder is distended, the peritoneum is drawn upward somewhat. This vesico-uterine fold of peritoneum forms the two so-called "vesico-uterine ligaments."

The peritoneum then folds over the uterus and tubes and round ligaments, covering these structures and forming the "broad ligament" of each side. All the posterior surface of the uterus is covered with peritoneum, except that portion lying within the vagina. The fold of peritoneum extends a considerable distance below the point of attachment of the vagina to the uterus (Fig. 3) before being reflected on to the rectum. The deep pouch of peritoneum thus formed is called the "cul-de-sac of Douglas" (Fig. 4). It is known also as the "posterior cul-de-sac" and as the "posterior peritoneal pouch" and as the "recto-uterine pouch." This posterior cul-de-sac is very important surgically. A collection of exudate or a tumor in this situation can be easily felt from the posterior vaginal fornix. This is the point of incision in posterior vaginal section, and it is usually the first place that the peritoneal cavity is entered in vaginal hysterectomy.

The peritoneum, as it is reflected from the uterus to the rectum, helps to form the "sacro-uterine ligaments." The sacro-uterine ligaments, two in number, one on each side, extend backward from the lower part of the uterus around the rectum to the sacrum. They are composed of connective tissue, a few muscular fibers and peritoneum. The cul-de-sac of Douglas dips down between them for a considerable distance (Fig. 4). The expanse of peritoneum extending from the sacro-iliac ligament to the broad ligament of each side forms a kind of shelf. The two together are sometimes called the "recto-uterine shelves." There is also a fold or shallow pouch of peritoneum on each side between the Fallopian tube and the round ligament. A small portion of the uterus at the sides and in front is not covered with peritoneum (Fig. 539).

The structure of the pelvic peritoneum is much the same as of peritoneum elsewhere. It is a very thin and smooth membrane, formed of a basis of delicate fibrous and elastic tissue, supporting large endothelial cells.

PELVIC CONNECTIVE TISSUE.

Between the peritoneum and the recto-vesical fascia there is connective tissue. This is distributed so as to fill in all the spaces (Figs. 539, 631). When it is necessary for organs to change their relation to each other in physiological activity, the connection is open and loose so as to permit free movement and much stretching. The principal collections of connective tissue are at the sides of and in front of the cervix uteri and at the base of each broad ligament. The areas of connective tissue are exceedingly rich in lymphatics and veins. Inflammation taking place in the connective tissue is called "pelvic cellulitis."

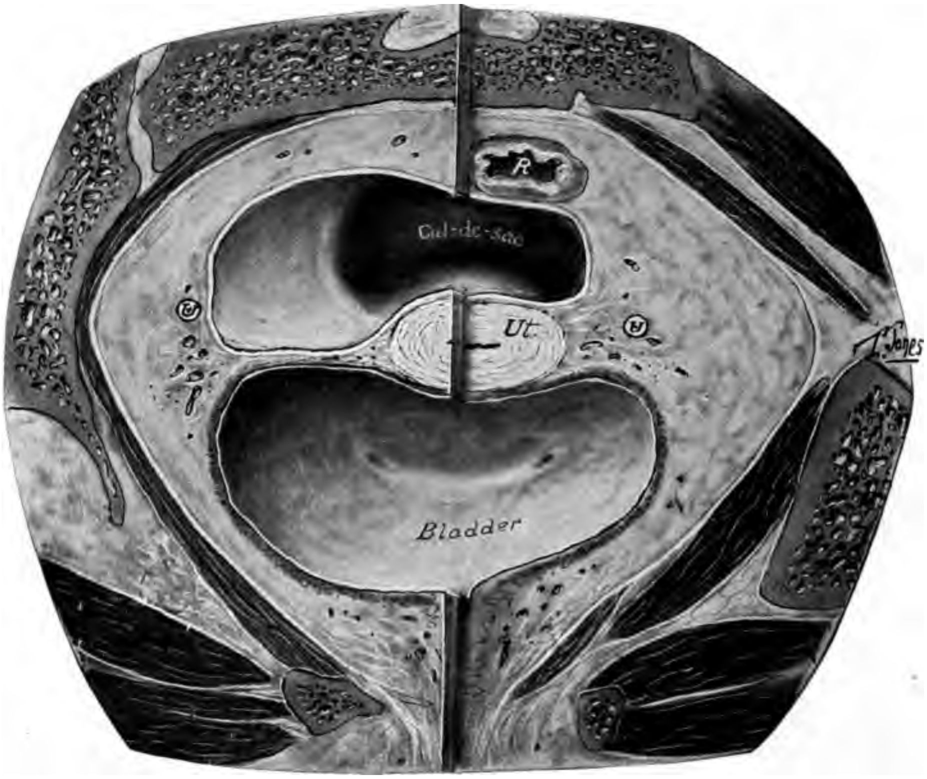


Fig. 631. The Connective Tissue of the Pelvis. Left side of pelvis—section through cervix, showing the large area of connective tissue at side of cervix. Right side—section at higher level, showing how the broad ligament becomes thinned, leaving only a small amount of connective tissue at side of corpus uteri.

The connective tissue about the uterus is often spoken of collectively as the "parametrium" of parametrial tissue, and inflammation of the same is accordingly called "parametritis." This is a very convenient term, but is likely to be confounded with the similarly sounding word "perimetritis." The latter means inflammation of the structures about the uterus, particularly, however, of the peritoneum and adnexa. In writing, these two terms may be safely used, but in conversation they are very liable to be confounded, as they sound so much alike.

It was formerly supposed that nearly all inflammation in the pelvis outside the uterus was inflammation of the connective tissue (i. e., pelvic cellulitis), but it has been found that in the majority of cases the inflammation invades first the tube and later the peritoneum, and that usually the involvement of the connective tissue, if present at all, is a late development and of only secondary importance. There are exceptions to this rule—for example, those inflammatory conditions resulting from tears of the cervix or from operation on the cervix. Also in puerperal infections, particularly streptococcic, the inflammation very frequently extends directly through the wall of the uterus in the pelvic connective tissue.

ACUTE PELVIC INFLAMMATION.

Coming now to the consideration of the disease itself, we find that pelvic inflammation may be acute or chronic. Let us consider first the acute variety.

The inflammatory process may be in the Fallopian tubes (salpingitis), or in the ovaries (oophoritis), or in the peritoneum (pelvic peritonitis), or in the connective tissue (pelvic cellulitis).

ETIOLOGY.

The cause of acute pelvic inflammation is infection. The infection may be with the ordinary pus germs (staphylococcus and streptococcus) or with the gonococcus. Practically every case of primary acute pelvic inflammation in the adult can be traced to infection from **labor**, from **abortion**, from **instrumentation** or from **gonorrhoea**. Secondary inflammation of the genital organs may be caused by extension from an inflammatory focus in some adjacent organ—e. g., the appendix or the bladder.

In a large proportion of the cases of pelvic inflammation, particularly the gonorrhoeal cases, the infection extends by way of the uterine mucosa to the Fallopian tubes, and through the tubes to the peritoneum and other pelvic structures. In puerperal metritis (streptococcic or staphylococcic) the infection more often extends by way of the lymphatics directly through the wall of the uterus, from the endometrium to the connective tissue around the uterus, and to the peritoneum. Another avenue of entrance is through the thrombosed sinuses of the puerperal uterus. Infection of these sinuses leads to infective thrombosis of the broad-ligament veins, resulting in broad-ligament abscess or general pyaemia or both.

The fact that nearly every case of pelvic inflammation is due to an infected endometritis emphasizes the importance of checking endometritis at once when present and of preventing it whenever possible.

PATHOLOGY.

The pathological changes are varied. There are hardly two cases exactly alike and the same case presents a very different picture at different periods. However, the cases may be divided somewhat into classes, as follows:

1. **Mild Salpingitis.** The inflammation is very slight. There is some round cell infiltration of the wall of the tube, with slight thickening and hardening, and a few fimbriae bound together. Both ends of the tube are open. This is the mildest form of pelvic inflammation, and as a rule gives rise to very few symptoms. A more severe type of the same class is that in which both ends of the tube are occluded and the fimbriae are matted together, and the tube distorted and often adherent to the ovary or to some other structure. The wall of the tube is thickened, but the cavity contains no appreciable amount of fluid.

2. **Salpingitis with Exudate.** In the cases of this class there is a large amount of exudate, binding together the tubes, ovaries, intestines and uterus. But there is no distinct collection of pus.

3. **Pyosalpinx** (Tubal Abscess). The tube is distended with pus (Fig. 416) and there are the usual evidences of inflammation within and without the tube, but no pus outside the tube. There may or may not be a large mass of exudate. In exceptional cases the infection may localize in the ovary instead of in the tube, causing an **ovarian abscess.** In still other cases the abscess cavity involves both the tube and the ovary, forming the **tubo-ovarian abscess.**

4. **Diffuse Suppuration in Pelvis.** In this fourth class the pus itself has extended outside the tube, the fibrinous exudate always extending before it and shutting it off from the general peritoneal cavity. This may result simply in an abscess low in the pelvis, which can be easily reached and evacuated from below, or the inflammation may extend until all the pelvic organs are bound together in an irregular mass, with pus lying in the spaces between them and burrowing into the connective tissue. In such a case there are present all the lesions of pelvic inflammation—salpingitis, oophoritis, peritonitis and cellulitis.

5. **Acute Diffuse Peritonitis.** In cases of this class the infection is so virulent and spreads so rapidly that but little limiting exudate is formed. The infection quickly involves the general peritoneal cavity and causes a fatal peritonitis. This is an unusual form of pelvic inflammation and is found principally in cases of severe sepsis following labor or abortion.

6. **Cellulitis** (Fig. 386). This is largely a lymphangitis of the connective tissue about the uterus. It is due usually to the streptococcus, the staphylococcus or the colon bacillus—rarely, if ever, to the gonococcus alone. Cellulitis is favored by deep laceration of the cervix, which opens up the connective area beside the uterus. Pelvic cellulitis, like inflammation of connective tissue elsewhere, may end in resolution or abscess formation or general sepsis. If resolution takes place or if an abscess forms and is opened, he inflammation subsides, leaving only infiltration and scar tissue, which

causes but few symptoms aside from distortion of the parts. The inflammation may, however, extend to the peritoneum, in which cases there are added the evidences of pelvic peritonitis.

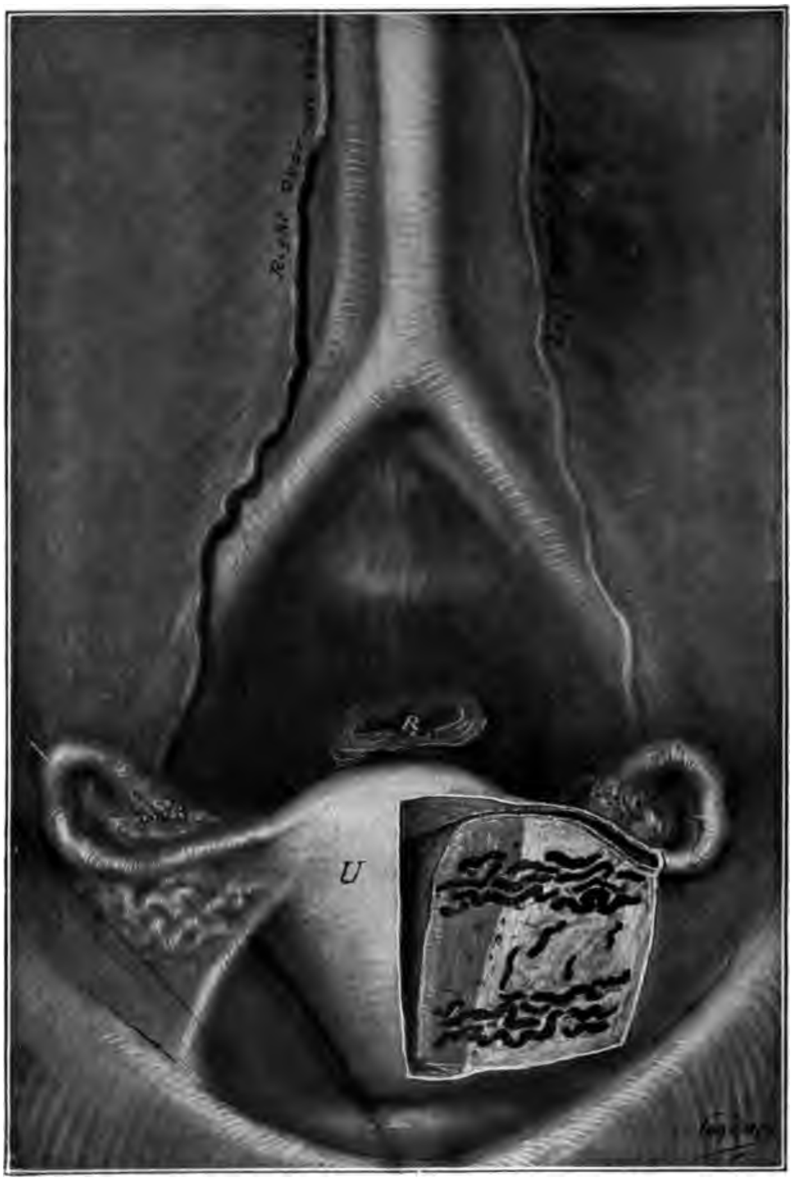


Fig. 632. Pelvic Thrombo-phlebitis. The left broad ligament has been laid open, and the site of the upper and lower group of thrombosed veins indicated. The right ovarian vein is shown thrombosed almost to its termination in the vena cava.

7. **Septic Thrombosis** (Fig. 632). This comes from infection of the normal thrombi filling the uterine sinuses after labor. It constitutes a severe and

often fatal form of puerperal sepsis. In the effort to limit the infective and destructive process in the sinus or vein, nature causes another thrombus to form proximal to the infected one. If the infection extends into the new thrombus, a portion of the vein proximal to that in turn becomes thrombosed. This process may keep on until the veins of the broad ligament become extensively thrombosed. If the infection enters through the upper part of the uterus (the usual placental site), it affects the ovarian veins in the upper part of the broad ligament (Fig. 632, left side). If it enters through the lower portions of the uterus, the resulting septic thrombosis affects the uterine veins lower in the broad ligament (Fig. 632).

If nature succeeds in limiting the process to this region, pockets of pus may form in the thrombosed veins and break into the connective tissue, forming a pelvic abscess, which can be recognized and opened. If nature does not succeed in limiting the process, it extends centrally—along the ovarian veins (Fig. 632) toward the vena cava, or along the lower veins to the internal iliac, the common iliac and finally to the vena cava. When the common iliac is involved, the process extends downward also along the external iliac vein, producing the usual signs of external iliac thrombosis (so-called "milk leg"). It must be kept in mind, however, that external iliac thrombosis may or may not be septic thrombosis, many cases occurring without any evidence of sepsis. At any stage of the septic process in the veins, infected particles may become detached and pass into the general circulation, giving rise to metastatic foci in various parts of the body, and constituting general pyaemia.

SYMPTOMS.

A patient with acute pelvic inflammation complains of **pain** in the lower abdomen, increased by movements, such as walking or turning over or sitting up. She is usually confined to bed. There may be moderate **fever** (101° to 103°) or there may be high fever (105°), the high temperature being found most frequently in pelvic inflammation following labor or miscarriage.

There is usually a **vaginal discharge**, due to the coincident inflammation of the endometrium, and there is a **history** of a recent labor or abortion, or instrumentation or gonorrhoea, or a history of a chronic endometritis due to one of these causes.

On abdominal examination the lower abdomen is found to be tender on pressure. This **tenderness** may be confined to one or both tubal regions or it may extend over all the lower abdomen. On account of this tenderness the abdominal muscles are held more or less tense, thus preventing deep palpation.

In the vaginal examination the character of the discharge is determined, indicating to some extent the etiology of the trouble, and there is noticed also the presence or absence of evidences of recent labor or miscarriage. Manipulations in the upper part of the vagina cause pain. This **tenderness** on vaginal palpation and bimanual palpation is found both in the body of the uterus and about the tube of one or both sides. If a **mass of exudate** is present, it may be felt to one side of the uterus or behind it. If the exudate is low in the pelvis—for example, in the posterior cul-de-sac or about a prolapsed ovary or tube—it may be easily felt back of the uterus just above the posterior vaginal formix. If the exudate is situated high in the pelvis, it may require very deep bimanual palpation to detect it, and the deep bimanual palpation may be impossible at first on account of the tension of the abdominal muscles. The mass of exudate is distinguished by its being more resistant (firmer) than the surrounding tissues and more tender on pressure. The exudate may extend all around the uterus, fixing that organ as though plaster of Paris had been poured into the pelvis and had hardened there. In these cases of extensive distribution of the exudate the sensation imparted to the examining fingers is that of a firm roof across the pelvis just above the vagina (Fig. 401). The uterus projects through this roof of exudate and is held firmly by it.

If there is a **collection of pus** of considerable size, fluctuation may be detected, the soft area being surrounded by a firm area of exudate which has not yet broken down. If there is only a small collection of pus, not large enough to give fluctuation, its presence is indicated by persistent fever and its location is shown by a point of marked tenderness. When there is an inflammatory exudate in the posterior cul-de-sac, fluctuation may in some cases be detected earlier by rectal than by vaginal examination, the rectal finger being able to palpate the posterior surface of the mass.

In **septic thrombosis** without other involvement and in puerperal pyaemia there may be no evidence of pelvic peritonitis nor of pelvic cellulitis—simply repeated chills and high fever without any palpable local lesion of sufficient extent to account for them. There is tenderness in the region of the veins affected, and in some cases distinct induration may be made out, particularly where there is more or less peri-venous inflammation. If the infection has come through the upper part of the uterus (which is the usual location of the placental site and hence of the area of penetration), the ovarian veins are the ones most likely to be affected. In many cases they alone have been found involved (Fig. 632, right side). When the infection penetrates the lower part of the uterus, the uterine veins and broad-ligament veins generally become affected, and later the internal and common iliac veins.

DIAGNOSIS.

The disease that may be confused with acute pelvic inflammation and that must therefore be taken into consideration in the **differential diagnosis** are as follows:

Acute endometritis.
Tubal pregnancy.
Appendicitis.
A tumor which has become gangrenous from twisted pedicle.
A suppurating tumor (usually a dermoid cyst or a necrotic fibroid).

In acute **endometritis** the bimanual examination shows that the tenderness is limited to the uterus. There is no marked tenderness in the peri-uterine structures, nor is any mass found there.

Tubal pregnancy has been so many times mistaken for ordinary pelvic inflammation that the differential diagnostic points should be considered in detail (see Tubal Pregnancy).

In **appendicitis** the pain is more likely to start as a general abdominal pain, the point of greatest tenderness and the inflammatory mass, if there is one, being in the appendix region instead of in the tubal region. In appendicitis also there is frequently a history of stomach or bowel disturbance preceding or associated with the attack of pain, while in salpingitis there is usually a history of uterine disturbance—dysmenorrhea, prolonged menstruation, vaginal discharge and other indications of a previous or coincident uterine disease. In girls and in unmarried women an attack of inflammation low in the right side is much more likely to be appendicitis than salpingitis. In some patients both structures are involved.

In all right-sided inflammations keep in mind appendicitis. One having his mind too intent on pelvic disease may overlook this. This fact is very well illustrated by a case in which I was called in consultation by a physician in this city. A few days before, the physician had operated for laceration of the cervix. Following the operation the patient developed pain in the lower abdomen and rapid pulse, and nausea and fever. The symptoms were persistent and progressive, and in three days the patient's condition became alarming. Fearing acute pelvic inflammation from infection at the site of operation, he asked me to see the patient. Examination showed the cervical wound to be in good condition and I could find nothing in the immediate vicinity of the uterus to account for the serious symptoms. But on searching further I found the patient had appendicitis, with peritonitis. The vomiting and intra-abdominal disturbance following anesthesia had evidently stirred to renewed activity an old focus of inflammation about the appendix. The patient had general peritonitis at the time I saw her and she died before the consent of her people to an operation could be secured.

In the case of a **tumor** which is **gangrenous** from twisted pedicle, the tumor has existed a long time, and one can usually get a history of pelvic disturbance caused by it, and in some cases a clear history of a tumor can be obtained. When the turning of the tumor with torsion of its pedicle takes place, that causes a sudden onset of serious symptoms—severe pain, extending more or less throughout the abdomen, and symptoms of shock. Later, as the tumor begins to degenerate on account of the cessation of its blood supply, local peritonitis comes on, causing fever. The local peritonitis may spread and become general peritonitis, and at this stage the origin of the trouble is much obscured. Absence of evidence of infected endometritis is another important point in the differential diagnosis of this condition from ordinary pelvic inflammation, as is also the absence of fever at the onset of the trouble and for several hours afterward.

A **suppurating tumor** is usually a **dermoid cyst,** connected with the ovary, and hence gives rise to a mass in the same region in which an inflammatory mass from salpingitis would be found. When suppuration takes place in an ovarian dermoid, there is resulting local peritonitis, with fixation of the mass by adhesions. The fever and pelvic pain and marked tenderness on examination all tend to further confusion with ordinary pelvic inflammation, making the differential diagnosis often very difficult and sometimes impossible. If the patient is a girl, or a woman who has never been pregnant nor had any uterine infection, the probability is in favor of dermoid tumor and against salpingitis. Two other points in favor of the mass being a dermoid tumor are (1) a history of pelvic disturbance, pointing to the existence of a tumor before the acute symptoms developed, and (2) the absence of vaginal discharge and other evidences of uterine infection.

Necrosis or suppuration within a uterine fibroid presents the evidences of inflammation added to evidences (past and present) of a fibroid tumor.

TREATMENT.

In the treatment of acute pelvic inflammation (acute salpingitis, acute oophoritis, acute pelvic peritonitis, acute pelvic cellulitis, and all combinations of these lesions), there are employed certain measures that may be called **general measures,** because they are applicable to all cases. There are employed also other measures that may be called **special measures,** because they are applicable to special conditions only.

GENERAL MEASURES.

The general measures, indicated in the treatment of practically all cases of acute pelvic inflammation, are as follows:

1. **Rest.** Keep the patient in bed. If the inflammation is severe, she should use the bed-pan and should not be permitted to get up to a vessel beside the bed.

2. **Laxatives.** The patient should have one or two good bowel movements daily.

3. **Hot vaginal douches** every six to twelve hours, the frequency depending on the severity of the inflammation.

4. **Applications to the Lower Abdomen.** The hot applications are usually most effective in relieving pain. In exceptional cases the cold applications give more relief.

5. **Sedatives.** If the pain is persistent in spite of the measures already mentioned, mild sedatives should be used, such as the bromides or preparations containing viburum prunifolium. Avoid morphine unless the pain is so severe as to make its use imperative, for it disturbs the stomach, checks the secretions and, in addition, masks the pain to such an extent as to interfere with our knowledge of the progress of the disease. The coal-tar antipyretics are also usually best avoided for the reason that they mask the fever. The pain and the fever are two important guides as to the progress of the inflammation, and hence should not be masked more than necessary. If there is much fever, cool sponging will give comfort and reduce the temperature and stimulate

the patient, and its effect can be more accurately gauged than that of internal antipyretics. If there is much pain, of course sedatives must be given in sufficient quantity to give rest. Codeine phosphate in ½ gr. to ¾ gr. doses disturbs the stomach less than morphia and usually gives relief. If not sufficient, then morphia will be necessary. Whenever sedatives or antipyretics are given, their effect must be allowed for in reckoning the extent or progress of the inflammation.

SPECIAL MEASURES.

The special measures, indicated in certain cases of acute pelvic inflammation, are most conveniently presented by stating the particular conditions for which they are used.

1. If the infection has followed **labor** or **abortion,** see that the interior of the uterus is clean. This will usually necessitate exploration of the interior of the uterus with the finger or curet (see page 96).

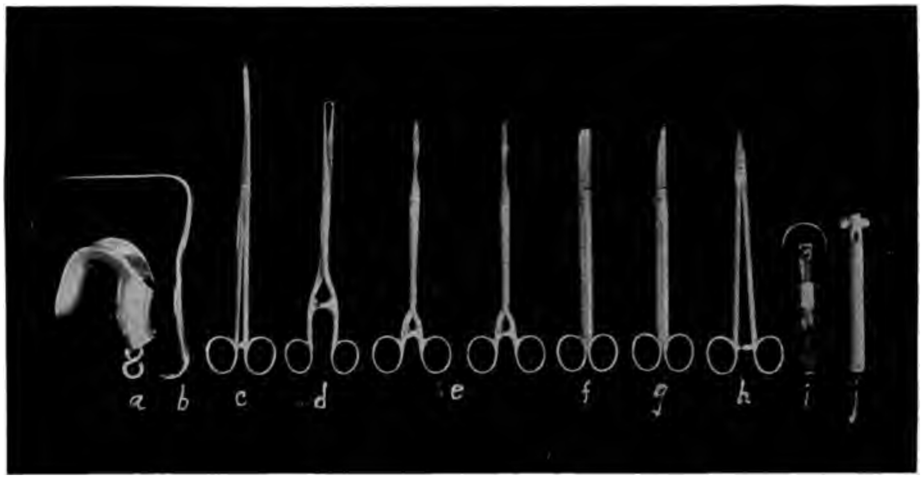


Fig. 633. Instruments for Opening Pelvic Abscess: a, self-retaining speculum; b, perineal retractor; c, vaginal dressing-forceps; d, uterine tenaculum-forceps; e, two long artery-forceps; f, long, curved, blunt scissors; g, long, curved, sharp-pointed scissors; h, needle holder; i, needle and ligature, for use in case of unusual hemorrhage; j, drainage tube with cross-piece.

2. If the infection has taken place through an **operation wound** of the cervix, remove the sutures so as to give free drainage to the inflamed area.

3. If a collection of pus can be felt **low** in the pelvis, open and drain it by vaginal incision. It requires care to open a deeply placed pelvic abscess widely and safely, particularly if the pocket of pus is small. The rectum, uterus, uterine vessels, ureter or bladder may be injured, or the abscess may not be opened and drained thoroughly enough to effect a cure. The instruments required are shown in Fig. 633.

The **steps** in the **operation** are as follows:

a. Examination Under Anesthesia.—After the patient is anesthetized and the vagina thoroughly cleansed, make a bimanual examination to determine the size and relations of the inflammatory mass and what portion of it is fluctuating. Determine also whether or not the corpus uteri is forward and hence out of the way of the operative work.

b. Incision Through Vaginal Wall.—Introduce the self-retaining speculum (Fig. 633) or a simple perineal retractor, swab out the vagina again with an antiseptic solution, catch the posterior lip of the cervix with a tenaculum forceps and raise the cervix so as to expose the posterior vaginal vault. Now, with a long forceps (Fig. 633-c), take firm hold of the posterior vaginal wall a short distance back of the cervix and then with a scissors or knife clip through the vaginal mucosa, between the forceps and the cervix. I usually use the same blunt curved uterine scissors with which the subsequent dissection is made. By a little traction on the forceps a ridge of mucosa is raised which is easily clipped through with the scissors. The opening is then lengthened to each side, curving slightly around the cervix, until it is an inch to an inch and a half long (Fig. 641). This gives an opening into the connective tissue back of the cervix, as shown in Fig. 634.

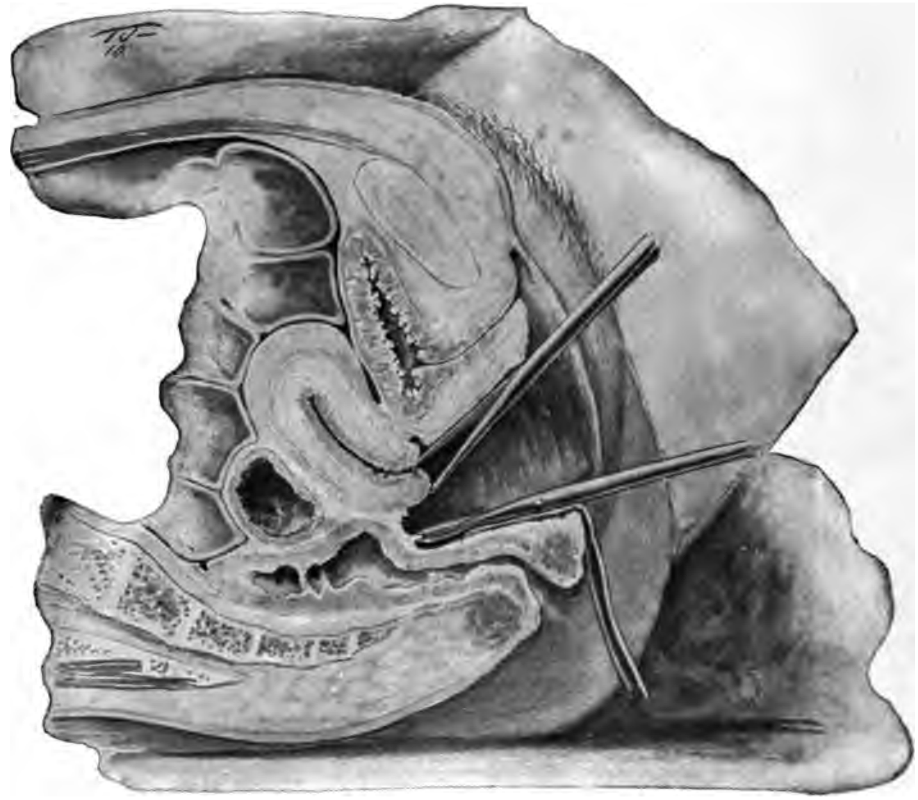


Fig. 634. Incision Through Vaginal Wall. The retractor has been introduced, the cervix caught with a tenaculum-forceps, and the vaginal wall clipped through just back of the cervix.

c. Blunt Dissection Through Connective Tissue.—This is most safely and conveniently accomplished by the sense of touch alone. The speculum, or perineal retractor, is removed and two fingers are introduced into the vagina, one of the fingers being carried into the wound back of cervix. With this finger blunt dissection is made upward through the connective tissue, keeping close to the wall of the cervix, which is distinguished by its greater hardness. This dissection is facilitated by introducing the closed blunt scissors some distance ahead of the finger as shown in Fig. 635, and then opening the scissors widely. The finger is introduced into the opening thus made in the connective tissue, and the scissors are again introduced beyond the finger and opened widely. In this way a wide tract may be made rapidly through the connective tissue, and it may be made safely, provided the operator keeps close to the cervix as indicated in Fig. 635. Each arrow in this illustration may be taken to represent a forward thrust of the blunt scissors beyond the end of the

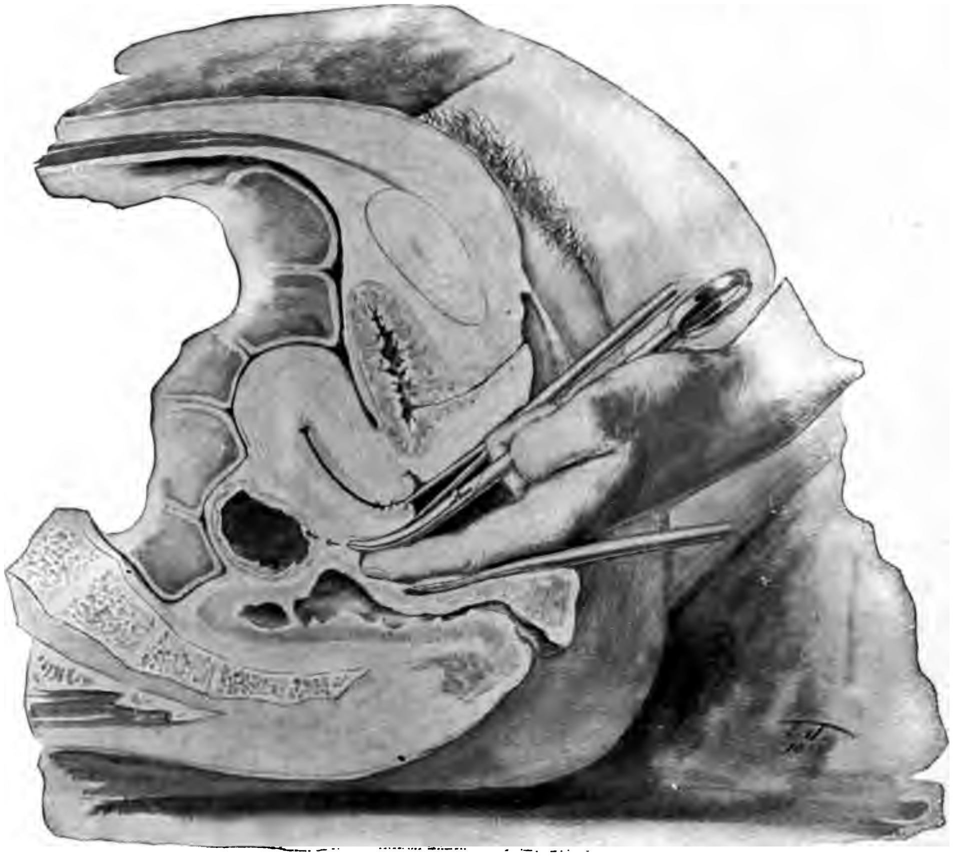


Fig. 635. Blunt Dissection Through Connective Tissue. The retractor has been removed to permit the fingers to be introduced into the vaginal incision, and dissection is now being made through the connective tissue with fingers and blunt scissors, as described in the text. The arrows show the direction of the dissection (between abscess and uterus and not between abscess and rectum), and each arrow may be taken to represent a forward thrust of the blunt scissors beyond the end of the finger.

finger. Notice that the direction of the dissection carries it between the uterus and the abscess instead of between the rectum and the abscess, and thus the danger of tearing into the rectum is avoided. On the other hand, the dissection must not be carried into the cervix uteri. Involvement of the tough tissue of the cervical wall is indicated by the blunt dissection becoming very difficult while still some distance from the abscess.

d. Puncturing the Abscess Wall.—When the wall of the abscess is reached, further advance by blunt dissection becomes very difficult or impossible. This wall of dense infiltration blocking further advance is especially marked in a long-standing abscess, but it is present in acute abscesses also to a considerable extent. The blunt scissors are now exchanged for the sharp-pointed scissors (Fig. 633-g), and with these the puncture is made into the center of the inflammatory mass. Care must be taken to make sure that the puncture will

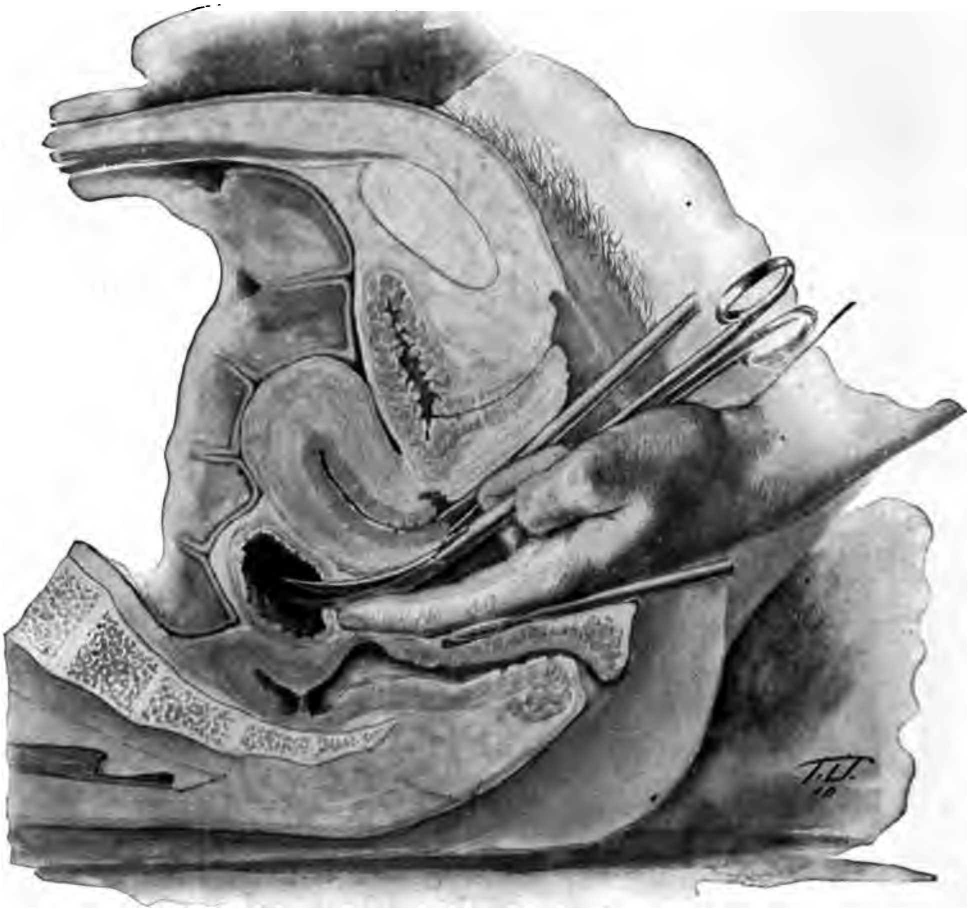


Fig. 636. Puncturing the Abscess Wall. The sharp-pointed scissors have been introduced into the mass under the guidance of the finger, and then opened widely.

not extend into the rectum. A hard fecal mass in the rectum may be mistaken for a portion of the inflammatory mass, or a gas-distended part of the rectum may simulate the soft, elastic feel of a fluctuating mass, or a collapsed pocket of the rectum may project between the vaginal vault and the abscess. In Fig. 634 this dangerous proximity of the rectal wall to the operative tract is well shown. If the line of blunt dissection is kept close to the uterus, the abscess wall is reached close to the uterus, with a considerable part of the abscess lying between the point of puncture and the rectum, as shown in Fig. 635. Should there be any doubt about this, leave the scissors in the tract and, with gloved fingers, make an examination per rectum. This examination gives a clear idea of the amount of tissue between the point of intended puncture (indicated by the end of the scissors) and the nearest portion of the rectal wall.

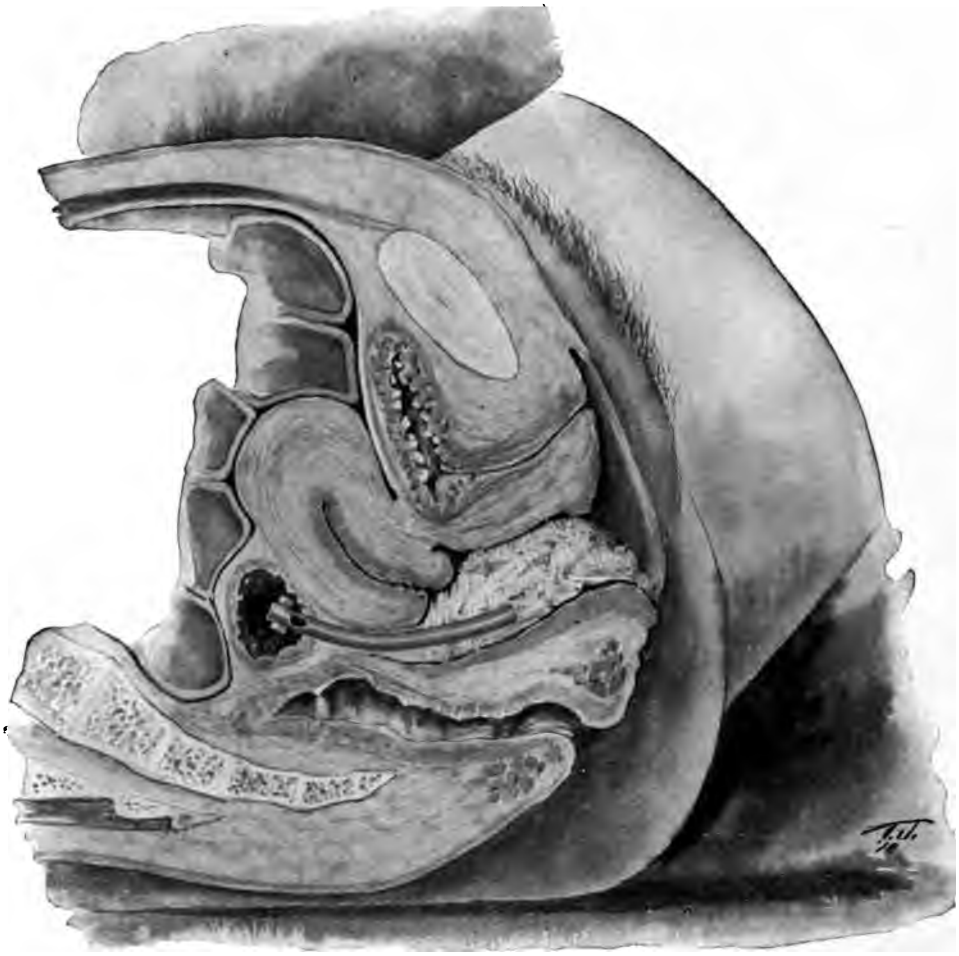


Fig. 637. Drainage Tube in Place. The cross-piece is to prevent the tube slipping out. The tube is cut off about midway of the vagina. The gauze packing extends into the connective tissue area about the tube, but not into the abscess cavity.

After the curved, sharp-pointed scissors have been pushed into the center of the mass, they are opened widely (Fig. 636) and then withdrawn while still wide open. This makes a large tract into the abscess. One or two fingers are then introduced into the cavity and its wall explored for secondary pus pockets. If a fluctuating area is found, it may be opened by the finger, dressing forceps or scissors, care being taken to avoid wounding the rectum or mistaking an adherent knuckle of intestine for a fluctuating pus pocket. While an adherent loop of intestine may feel soft and elastic, it never presents the tense fluctuation and resistance of a pus pocket, unless obstructed. In this palpation of the interior of the abscess cavity, all manipulation should be made gently, so as not to break through the protecting roof of exudate.

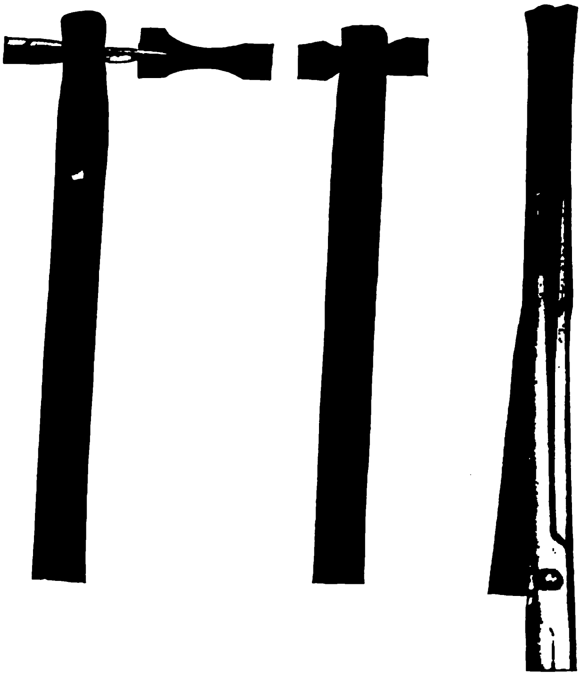


Fig. 638. Showing how to arrange a Drainage Tube with a small cross-piece at the end to keep the tube from slipping out of the cavity. To introduce the tube, the cross-piece is turned up on each side and the end of the tube is grasped with a forceps, as shown to the right of the illustration.

e. Drainage.—After all pus pockets are opened, introduce a good-sized drainage tube into the abscess cavity (Fig. 637). Swab out the vagina and pack it lightly with antiseptic gauze. The upper end of the gauze should be packed rather firmly into the connective tissue about the tube, so as to stop any bleeding there. The gauze is to be packed only a short distance into the wound, so that it will not pull out the tube when it is removed, for the rubber tube is to be left in place until the cavity is nearly obliterated by granulation, which requires two to six weeks.

The drainage tube will not stay in place without some special device. A very convenient expedient is to introduce a short piece of a smaller tube crosswise through holes cut near the end of the main tube (Fig. 638). This drainage-tube is introduced into the abscess cavity by grasping it with a long forceps as shown in the illustration. When in place, the forceps are removed and the cross-piece resumes its original position, and thus prevents the tube slipping out of the cavity. When it is desired to remove the tube, slight traction causes the ends of the cross piece to fold up, and the tube is removed

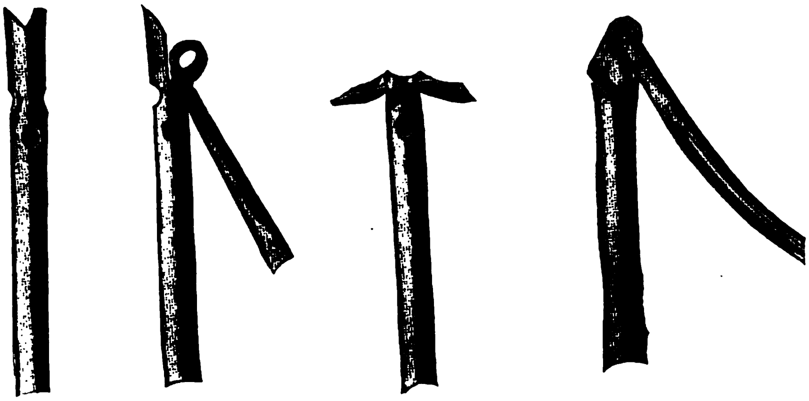


Fig. 639. Another method of arranging a cross-piece on the end of a Drainage Tube to keep the tube from slipping out of the cavity. (Reed—*Text-book of Gynecology.*)

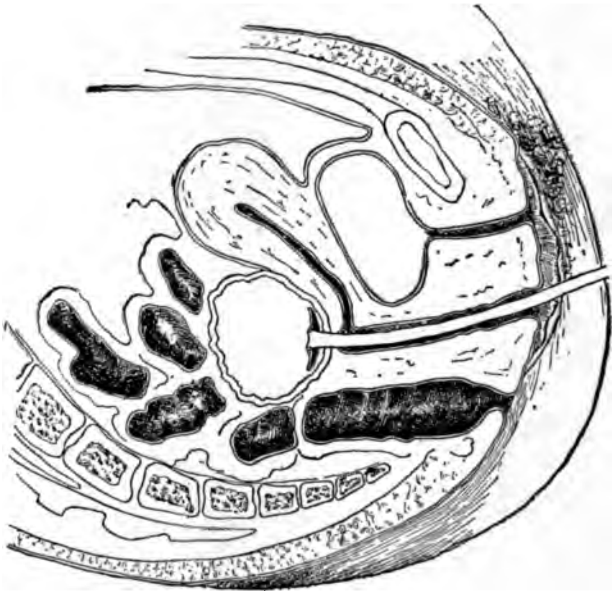


Fig. 640. The Drainage Tube in Place in a Pelvic Abscess Cavity. (Reed—*Text-book of Gynecology.*)

with but little pain. Another method of forming a cross-piece on the tube is shown in Fig. 639, and such a tube is shown in place in Fig. 640. After the tube is in place, its lower end is cut off at about the middle of the vagina and the vaginal gauze packing is distributed around it. If the tube is allowed to extend outside the vaginal entrance, it causes more or less irritation of the external surfaces, and if it is cut too short it may slip up into the abscess cavity and be lost.

Errors to Avoid. One error to avoid is **irrigation of the cavity.** The free opening of the abscess relieves the tension, and this, with the subsequent drainage, is all that is required. Furthermore, if a stream of fluid is run into the cavity, it may break through some weak place in the protecting wall and cause infection of the general peritoneal cavity. Irrigation, therefore, is not only unnecessary, but dangerous, and may cause fatal peritonitis in a case that would have recovered promptly under simple drainage.

Another error to avoid is **dependence on gauze drainage.** A considerable proportion of failures and secondary operations are due to this. When there is a distinct abscess cavity, there will necessarily be discharge for some time, and this discharge should find ready exit through tube drains. Gauze packing is very good for checking bleeding or for holding the tract open for a few days, but it is not satisfactory when prolonged drainage is necessary, and prolonged drainage is necessary in practically all cases where a distinctly walled abscess has formed. In the crowded and contracting tissues of the pelvis, tube drainage is the only kind that will keep the drainage tract open satisfactorily and conveniently for the length of time required for a large cavity to become obliterated by granulation. And the best time to place this tube drain satisfactorily is when the patient is under the anesthetic and the abscess just opened.

Variations. In a case of tubal abscess where the pus has not yet escaped from the Fallopian tube, the cul-de-sac of Douglas is opened before the abscess proper (tube wall) is reached. The cul-de-sac may or may not be shut off from the general peritoneal cavity by adhesions. In some such cases a small amount of serous fluid escapes when the cul-de-sac is opened. Exploring this non-purulent cavity, the finger encounters the distended, fluctuating tube, which is then opened, with a resulting free discharge of pus. Two points of importance in such a case are: first, to make a free opening in the wall of the distended tube, and, second, to place the end of the drainage tube inside the affected tube and not simply in the cul-de-sac.

In draining a broad ligament abscess, avoid opening the peritoneal cul-de-sac. Such opening is unnecessary and is dangerous, for the uninfected cul-de-sac is not likely to be walled off from the general peritoneal cavity. In operating in a case where the inflammatory mass is situated laterally, the vaginal wall is cut through as before, and then the dissection is directed laterally between the layers of the broad ligament, as indicated in Fig. 641. In this way a collection of pus situated even in the upper part of the broad ligament may be drained freely without opening the peritoneal cavity.

In an acute inflammatory mass without pus it may in certain cases be advisable to drain. In a considerable proportion of inflammatory masses it is impossible to say positively before operation whether or not there is a pocket of pus in the mass. If the general symptoms are threatening and the mass is increasing in size and tenderness, drainage is advisable—on the general surgical principle of immediate drainage of an acute infected focus that nature is failing to limit. In such a case the steps are the same as for a distinct abscess—viz., blunt dissection through the connective tissue, puncture to the center of the mass with sharp-pointed scissors and enlargement of the tract by withdrawing the scissors wide open. The interior of the mass is then palpated with one or two fingers and perhaps opened further in various directions. If no pus is found, the cavity is packed lightly with gauze. As there is no distinct pus cavity, there is no indication for tube drainage. However, if when the gauze is removed after two or three days a free purulent discharge is present (due to an adjacent pus pocket opening into the cavity or to the advancement of the inflammatory process to the point of suppuration), then a small drainage tube with cross-piece should be introduced at the time the gauze is removed. If no pus is present, no tube drain is required—simply vaginal douches, with or without light gauze-packing of the tract, as preferred. I have seen, in a number of instances, marked relief from pain and rapid resolution follow this puncture and drainage of an acute inflammatory mass without distinct pus formation.

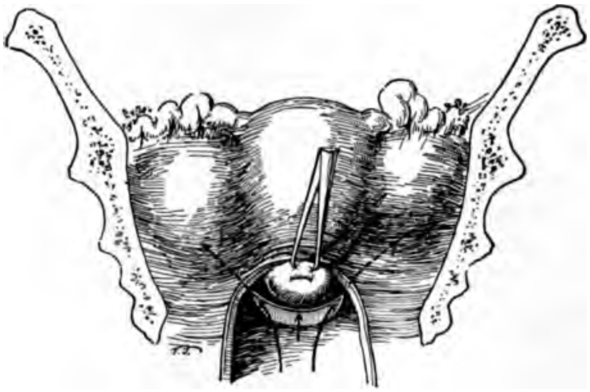


Fig. 641. Opening Lateral Abscesses. After the vaginal wall is cut through, the blunt dissection is directed laterally into the broad ligament, as indicated by the lateral arrows. In this way opening of the peritoneal cavity may be avoided.

After-treatment. In the after-treatment of an opened pelvic abscess the two important points are (1) continued free drainage until the cavity has been practically obliterated by granulation, and (2) avoidance of unnecessary irritation, such as repeated packing or probing of the tract, or frequent syringing of the abscess cavity.

Neglect of the first point is the cause of the failure in a large proportion of the cases where the abscess reforms and requires secondary operation—that is, when the case has been well chosen and is really suitable for vaginal drainage. The neglect of the second point causes much unnecessary pain and irritation by repeated probing and packing of the suppurating tract, and also contributes to failure by early removal of the well-placed rubber drainage tube, which is the only efficient method of continued drainage in this situation.

The gauze in the vagina is removed in one or two days and after that an antiseptic vaginal douche is given one to three times daily, the frequency depending on the amount of discharge. The patient is kept in bed for a week; and after that, if there is no pain nor fever, she is allowed to be up and about. If the tube stops up at any time, it may be cleared out by injecting some hydrogen peroxide into it. If this does not clear it, it is probably stopped by a slough or fibrinous mass. Remove the tube and, after clearing it thoroughly, reintroduce it or a smaller one. For changing the tube or for any manipulation about the opening back of the cervix, the Sims posture is more convenient than the dorsal posture (see page 86).

The tube should be left in place as long as there is a cavity to discharge—varying in different cases from two to six weeks. If after the large tube has been in for a week the patient complains of pain on bowel movement or other pain in pelvis, remove the tube and introduce a smaller one. As the abscess cavity contracts, it is necessary to reduce the size of the tube and cross-piece sufficiently to prevent pressure-ulceration of the rectal wall. Continue the douches for at least a week after tube is removed and all discharge has ceased.

4. If a **collection of pus**, or a **mass of exudate** that may or may not contain pus, is found high in the pelvis, do not disturb it during the acute attack unless the patient's life is threatened by the severity of the process. Avoid abdominal operation in the primary acute attack if possible. There are two reasons for this—first, the patient may recover completely under the minor measures (rest, laxatives, hot douches, curettage), and, second, if extirpation of the mass is finally necessary, it can be carried out later with much less danger to the patient. There is less danger later because collections of pus in the pelvis become less virulent after a time. In many old pelvic abscesses the bacteria are dead and the pus is sterile, and extensive contamination of the field of operation fails to cause peritonitis. If, on the other hand, the operation is done early while the bacteria are still virulent, contamination of the field is very likely to result in fatal peritonitis.

In mentioning the fact that the majority of inflammatory masses in the pelvis become sterile after a time, attention must be called to an exceptional class—namely, the streptococcal cases. In the streptococcal masses automatic sterilization or attenuation is uncertain. Though sometimes present, its occurrence can never be counted on. In streptococcal masses the bacteria have been found active and virulent after long periods—even years. Consequently, in these cases intraperitoneal operation is never safe. The persistence of virulence in streptococcal cases, how to recognize them before operation, what to do for them when operation is necessary, and other points of interest are considered in detail under chronic inflammatory masses in the pelvis (see pages 751 to 754).

In acute inflammatory masses, whether streptococcal or gonococcal, intraperitoneal operation is to be avoided. Those abscesses situated high are the ones now under consideration. If the symptoms are urgent, and the pocket of pus can not be reached and drained per vaginam, it may be possible to drain it extraperitoneally by operation above Poupart's ligament. This is entirely practical when the abscess is situated in the broad ligament (as most streptococcal abscesses are) and it has proven a life-saving measure in several instances. The route followed is the same as for ligation of the external iliac artery. In all but exceptional cases, however, an abscess in any part of the broad ligament can be reached and drained satisfactorily per vaginam by any one familiar with vaginal work.

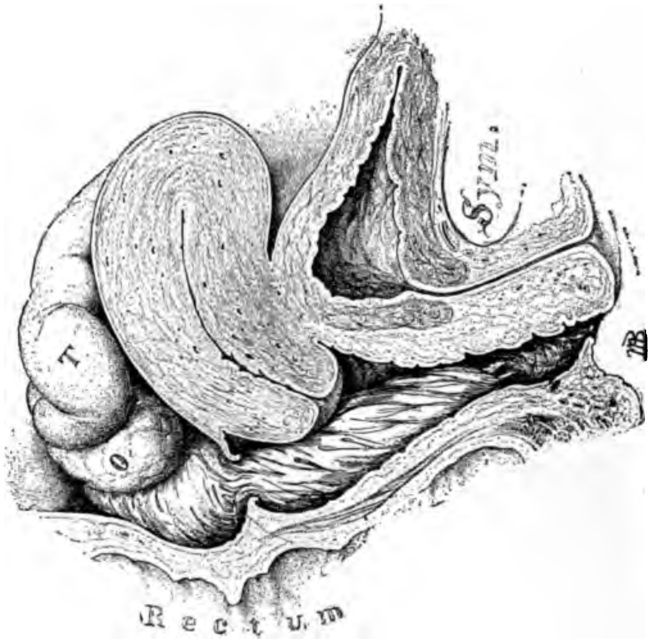


Fig. 642. Vaginal Section for Acute Pelvic Inflammation, showing the gauzing packing in place. (Kelly—*Operative Gynecology.*)

5. If the inflammation takes the form of a **rapidly-spreading peritonitis,** with little or no limiting exudate, or in spite of limiting exudate, the peritoneal cavity should be opened and drained, either by vaginal section or abdominal section or both. Such cases are seen principally in pelvic inflammation following labor or miscarriage and constitute a severe type of puerperal sepsis. The inflammation may have extended directly through the wall of the uterus to the peritoneum, or first to the Fallopian tubes and from there to the peritoneum. In either case there is a rapidly spreading peritonitis of virulent type and the patient is in a desperate condition. There are two methods of dealing with these cases:

Vaginal Section.—Open into the pelvic cavity by posterior vaginal section and let the infected peritoneal fluid run out. Palpate the uterus and appendages, and, if a collection of pus is found, evacuate it. Put in a large size rubber drainage tube and pack the pelvis lightly with gauze, letting the ends extend out into the vagina (Figs. 642, 643). Washed iodoform gauze has been recommended for this intraperitoneal packing, but several instances of iodoform poisoning from absorption have been reported. It is safer to use plain gauze wrung out of a weak bichloride solution. The principal effect desired is drainage and this is accomplished by the rubber tube. The gauze packed in the wound about the tube checks bleeding, and preserves a good sized cavity about the tube, and thus drains the entire pelvis instead of a small sinus, which might be all that would remain were the structures allowed to collapse about the tube immediately after its introduction. Gauze is then placed in the vagina and a large dressing applied over the vulva, and the patient put to bed. The gauze in the vagina may be removed in twenty-four hours, the vagina cleansed, and fresh gauze inserted or douches given, as preferred. The gauze in the pelvis should be left in place from two to four days, providing there is good drainage during that time. When it is removed, reintroduce the rubber drainage tube to insure good drainage and keep the vaginal wound from closing too soon.

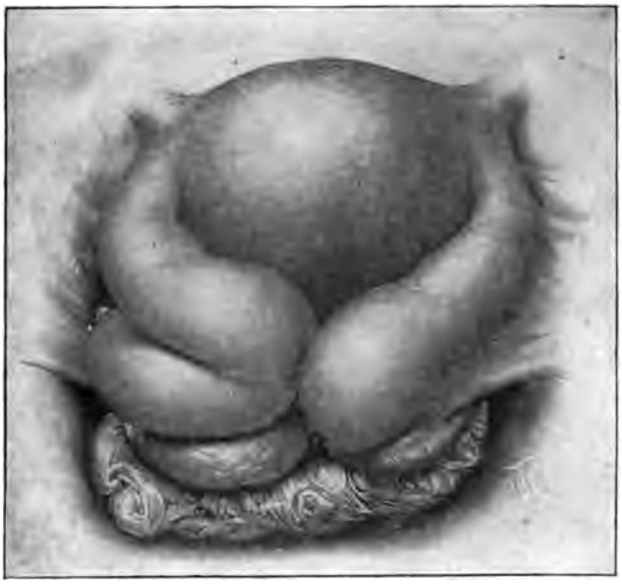


Fig. 643. Vaginal Section for Acute Pelvic Inflammation. A view from above, showing the packing in contact with the inflamed tubes. (Kelly—*Operative Gynecology*.)

Abdominal Section.—Open the abdomen by incision in the median line and make free drainage with a glass tube to the depth of the pelvis, with or without removal of affected tube or tubes, as seems best in the particular case.

Of the two methods of pelvic drainage, the first (vaginal section) is the preferable one in the majority of cases of acute virulent pelvic peritonitis if the inflammation is still confined to the pelvis. When the general peritoneal cavity is not involved, vaginal section accomplishes all the important results that can be accomplished by abdominal section—the emptying of pus pockets and free drainage of the infected area—and with much less danger to the patient. Of course, if the infection has already extended to the higher portions of the peritoneal cavity, there may be pockets of septic fluid in the central abdomen which can not be evacuated from below. Under such circumstances abdominal operation is usually required, either alone or in combination with vaginal drainage. In addition to drainage of the infected peritoneal cavity by vaginal section or abdominal section, or both, there are certain other measures of much importance in acute peritonitis—namely, stomach lavage and withholding nourishment by mouth (to prevent injurious intestinal peristalsis), Fowler posture (for drainage) and the introduction of large quantities of normal saline solution into the system (to strengthen the vital organs and aid elimination).

The **treatment of acute spreading peritonitis** of virulent type has undergone a radical change in the last few years, and with remarkable reduction in the mortality. Formerly eighty to ninety per cent of these patients were lost. Now eighty to ninety percent are saved. This splendid result has been obtained by a more intelligent aiding of nature in the **limitation*** of the infective process and in the **elimination** of the infective material. In order to bring out the essential features in handling these cases of general peritonitis, or of local peritonitis threatening to become general, it is necessary to say a few words in regard to nature's efforts at caring for them. The process is best studied where a quantity of infective material is liberated suddenly in the peritoneal cavity, the best examples of which are seen in perforations of the intestinal tract. The most common of these is perforation of the appendix. Hence, the great advance in the treatment of peritonitis of virulent type has been made largely from the study and treatment of cases of perforative appendicitis. In this study it has been established that, in nature's attempt to protect the system from the infective material, there are three important factors, as follows: a. A wall of exudate which surrounds the infective material, binding together the adjacent surfaces, and opposing an organic barrier to the spread of the infection. b. Immobilization of the intestinal coils, which

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*This limitation of the infective process is effected by the inflammatory infiltration and exudate and adhesions. These features are protective and constitute nature's method of combating the spread of the infection. The protective features of inflammation have been strongly emphasized in recent years by a number of writers, particularly by Dr. Channing W. Barrett, who states in a recent article, "Inflammation is not the fire, it is the fire department; it is not the epidemic, it is the health department; it is not the army of invasion, it is the army of defense." However, in combating the old idea that inflammation was wholly a destructive process, I see no reason to go to the other extreme and try to label it as a wholly constructive or protective process Peritonitis (or inflammation in any other situation) is a complex condition, and any complete conception of it must include both the invading organisms and the resisting forces. The term "peritonitis" is used, and I think rightly used, by clinicians to designate the conflict between these opposing forces and the usual results thereof. To use the simile of my friend above quoted: Inflammation is not the army of invasion, neither is it the army of defense—it is the *conflict* between the two. In one case it is a short sharp local fight, while in another case it is a prolonged conflict along a far-flung battle line, that may involve the whole body.

prevents mechanical spread of the infectious material, such as would necessarily take place in the presence of normal intestinal peristalsis. This immobilization of the intestinal coils is formed in part mechanically by the adhesions forming the wall of limiting exudate, and in part physiologically by the anorexia, which causes very little food to be taken, and by the vomiting, which rejects a large part of that which is taken. c. Elimination—first of the toxins through the kidneys and other eliminative organs, and, second, of the infectious material itself through an opening to the external surface of the body or into some hollow organ.

Such in brief is nature's method of handling these cases. The results vary with the virulence of the infection, the vital resistance of the individual, and the efficiency of the outside help. These are desperate cases. With or without outside help, the patient's life hangs in the balance, and every move that is made should be made with the idea of aiding nature and not handicapping her. Such intelligent assistance can be given only by a well-balanced consideration of each of the three factors above mentioned. One or another of these factors has at various times been given undue prominence in the treatment. The old opium treatment considered the immobilization and the exudate, with practically entire neglect of elimination, either general or local. The later treatment by operation, widespread irrigation and mopping of peritoneal surfaces, and extensive drainage, was based upon an exaggerated idea of the importance of elimination and an erroneous idea as to how best secure the really necessary elimination. This method, which was practiced generally a few years ago, took almost no account of any factor save drainage.

In the present method of treating such spreading peritonitis the **wall of exudate** is preserved as far as possible by employing simple drainage without irrigation or extensive exploration, or any other manipulation, except that necessary to give exit to the infected material and perhaps remove a sloughing structure or close an opening into the intestinal tract. The **immobilization** of the adjacent intestinal coils is favored by leaving the adhesions and by quieting intestinal peristalsis through withholding all food for a few days and through stomach washings. **Elimination** is secured through simple drainage of the infected site and, when needed, of the pelvic peritoneal pouch, aided by the half-sitting posture (Fowler's posture) and the free use of normal saline solution, particularly by slow continuous rectal absorption (proctoclysis).

This combination treatment has reduced the mortality of acute general peritonitis from 80 to 90 per cent to 10 per cent, and even below. This remarkable result is well established and unquestioned. However, there is considerable difference of opinion as to the relative importance of different factors in the treatment. J. B. Murphy was the first to arrest the attention of the profession generally, and focus it on this subject, by the report in 1905 of a series of 29 cases of acute general peritonitis with 28 recoveries. Murphy laid stress on three factors—viz., simple drainage (without irrigation or other extensive intraperitoneal disturbance), the Fowler posture and proctoclysis. A late report of his experience (Surgery, Gynecology and Obstetrics, Feb., 1910) gives 58 cases with 56 recoveries. Other operators have secured nearly as good results by this treatment, so that it is now very generally employed with the saving of many patients. A. J. Ochsner has rendered valuable service by emphasizing the necessity of intestinal mobilization by withholding all food and washing out the stomach. This is important both before operation and after operation until the process is well localized. Ochsner laid special emphasis on its use before operation and in certain carefully selected cases, instead of operation during the acute stage. This last recommendation, of using it to the exclusion of operation in certain desperate cases, is a questionable one at present. When this treatment was first proposed as a substitute for immediate operation in the carefully selected cases belonging to that fatal class generally recognized as "too late for early operation and too early for late operation," it undoubtedly saved many patients, for it was opposed to the extensive operation and general irrigation treatment then in use, which gave a mortality of 80 to 90 per cent. By absolute rest of the stomach and upper bowel, secured by painstaking attention to detail, Ochsner was able to tide the patients over the critical period and operate later with a reduction of the mortality to one-fourth what it was formerly—i. e., to the neighborhood of 20 per cent. With the substitution of simple drainage, however, for extensive operation in these cases, the serious objections to operation (shock and mechanical spread of the infection) have practically disappeared even in the most desperate cases. When the patient is so weak that general anesthesia is not advisable, the simple drainage may be made under local anesthesia and the exit of infected material through this vent may turn the tide of battle to the saving of the patient. That this is true is shown conclusively, I think, by the fact that Murphy, employing drainage associated with other less important features, was able to save 56 out of a series of 58 cases—reduction of the mortality to less than 4 per cent.

Associated with drainage, stomach washing and intestinal rest are important features, both before and after operation. In fact, some insist that the splendid results which attend the "Murphy treatment" are due, aside from drainage, almost entirely to the stomach and intestinal rest so strongly emphasized by Ochsner. In a recent article, G. S. Brown, in support of the contention, reports a series of 17 cases of diffuse peritonitis with 14 recoveries, in which the treatment employed was drainage by operation combined with the antiperistaltic regimen of Ochsner, "without the use of the Murphy-Fowler features." It is difficult to decide certainly as to the relative importance of each of the factors which enter into the present successful treatment of extensive peritonitis. There are several reasons for this. There are certain essential technical details about some of the factors that are not always fully comprehended and carried out—hence confidence may be lost in one or another feature of the treatment simply through the inefficiency of the one who employs it. Again, physicians differ much as to the cases they classify under "acute diffuse peritonitis," thus causing a marked difference in the mortality records. Still again, the combination method generally employed, while contributing to splendid results, contributes also to uncertainty as to the relative importance of the various features. I mention this uncertainty, not to discourage the use of the combination treatment, but simply to call attention to the fact that there is probably good in each of the features and that it is not wise to make positive statements as to the exclusive sufficiency of this or that feature until we have acquired more definite knowledge through further experience.

The **combination treatment** for acute spreading peritonitis which I consider best is, in detail, as follows:

a. Withhold all Food and Cathartics by Mouth and Empty the Stomach With a Stomach-tube. As soon as an acute spreading peritonitis is recognized arrangements should at once be made for a drainage operation. The sooner the infecting material is given an external exit, the better will be the patient's chance for recovery. While preparing for the operation, however, and also subsequent to operation, this antiperistaltic treatment is indicated. There are certain details that must be carried out to the letter to secure the best results. No food of any kind is to be given by mouth, not even a teaspoonful of liquid nourishment. The least nourishment taken into the stomach and passing into the intestine will excite intestinal peristalsis and defeat the purpose of the treatment. Also, the food already in the stomach will excite peristalsis unless removed. Very often considerable has been removed by vomiting, but vomiting is not to be depended upon. Though the patient has vomited several times, still there may be enough food remnants remaining to pass into the intestine and excite it to action. In fact the persistence of vomiting indicates the presence of some irritating material in the stomach. Consequently, the stomach-tube should be used to insure thorough emptying of the stomach in every case, except where there is some special contra-indication to its use (ulcer of stomach, carcinoma, child too young, etc.)

The gastric lavage may be simplified and made less disagreeable by attention to details. Turn the patient well over on the side, preferably the side in which the inflammatory process is located. Spray the pharynx with a four per cent. solution of cocaine, spray it three or four times in the course of five minutes, directing the patient to hold the solution in the pharynx for a few seconds and then expectorate it. The stomach-tube should be of good size, with an opening at the side as well as at the end. Cool it in ice water and introduce it without special lubrication—simply wet with the ice water. Direct the patient to assist the passage of the tube along the oesophagus by swallowing repeatedly. Gastric lavage has come into such general use in the treatment of post-operative gastric-dilatation and other conditions, and is so necessary, that a physician having anything to do with an abdominal case should know how to introduce the stomach tube without disturbing the patient overmuch. When the tube has reached the stomach, siphon out the contents. Then introduce warm normal saline solution and siphon it out repeatedly until it returns clear. Use a pint and more if necessary, and at the end empty the stomach as nearly as possible.

This gastric lavage makes the patient more comfortable. It gives the stomach rest from irritating decomposing material, diminishes the peristalsis, diminishes the distention, and stops the vomiting, which in itself does harm by disturbing the limiting adhesions. The one stomach washing may be all that is needed. If the vomiting recurs, however, lavage is again indicated, for it means usually that reverse peristalsis has brought material from the upper intestine into the stomach, and this should be removed by the tube as was the first. In nature's method of localizing the infection, inhibition of peristalsis in adjacent intestinal coils (temporary intestinal paralysis) is an important factor. If there is food in the upper intestine, it excites peristalsis. Now, this normal peristalsis and onward progress being interfered by the immobilization of certain intestinal coils, there is reverse peristalsis, which carries the irritating material back into the stomach, where it is partially thrown off by vomiting. The continued administration of food, and especially of cathartics, aggravates the peristalsis and reverse peristalsis, adding much to the patient's danger and discomfort. Two or three extra stomach washings at intervals of several hours may be necessary before complete rest of the stomach and bowel is secured. This complete emptying of the stomach and upper bowel has a very decided effect within twelve to twenty-four hours. There is cessation of the vomiting and diminution of the nausea, distention, pain and fever. The pulse and respiration improve, and the discomfort and threatening symptoms disappear to a large extent. Ochsner remarks, "Usually the improvement is so rapid that one is tempted to spoil everything by giving nourishment by mouth, because the patient's condition does not seem serious enough to warrant such severe deprivation measures." This treatment is to be used while arrangements are being made for operation and it is to be used also after operation, along with the Fowler posture, proctoclysis and rectal nourishment until the inflammatory process is well localized and stomach feeding may be safely resumed.

b. Drainage of the Infected Area, with the Least Possible Intraperitoneal Disturbance. This should be carried out as soon as possible. There should be no irrigation and no breaking of adhesions, beyond that absolutely necessary to drain the pus pocket or pockets and, in certain exceptional cases, to remove sloughing tissue or close a hole in the intestinal wall. The anesthesia should be of the shortest possible duration, in order to diminish the further burden on the already overburdened eliminative organs. In some cases the drainage operation can be carried out largely or wholly under local anesthesia, aided by a dose of morphine given about a half an hour before. As a rule tube-drainage in some form should be employed, with or without gauze, as preferred. If the pelvic peritoneal cul-de-sac is to be drained through an abdominal incision, the glass tube is best. In other situations rubber tubing is preferable. It may be split spirally or longitudinally, or may have holes cut in the sides. If the drainage is made per vaginam, the drainage tube should have a cross-piece (Fig. 637) to prevent it slipping out, for in this situation the tube must remain a long time, as previously explained.

In cases where there are several pockets which can not be drained satisfactorily through one tube, it may be necessary to put in two or more tubes. bringing them out through the same opening in the abdominal wall or through separate openings.

c. The Fowler Posture. Immediately following the drainage operation the head of the bed should be raised two feet (Fig. 738). This causes all fluid in the peritoneal cavity to gravitate to the pelvis, where it escapes through the drainage tube. As soon as the patient is strong enough—that is, within a day or two—this drainage may be more comfortably and efficiently maintained by the regular Fowler posture—half sitting posture (Fig. 739).

d. Proctoclysis. The introduction of normal saline solution into the system gives important aid to the heart and kidneys, and facilitates the elimination of septic material. If the patient is very weak immediately after the drainage operation, one or two pints of the solution may be given subcutaneously. At the same time the giving of the solution by the rectum should be begun and continued for several days. It is best given by slow continuous absorption. To secure this certain essentials must be observed, as follows: (a) the fluid must be maintained at a temperature of about 100° F., (b) it must flow into the rectum slowly, drop by drop (about one and a half pints per hour), and (c) there must be no obstruction or constriction in the tube that would interfere with the free regurgitation of fluid or gas from the rectum. The apparatus, whether simple or elaborate, must conform to these essentials. The success of the method depends upon accuracy in its application. The following description is that given by J. B. Murphy, who developed the method to its present perfection:

"As soon as the patient is returned to bed after operation, proctoclysis is instituted and maintained until the serious symptoms of intoxication cease. The continuous method is by far the most scientific and successful. Moderate distention is the normal condition of the large intestine. If it is hyperdistended, it causes spasm and expulsion of material. The mucosa of the large intestine absorbs water with great rapidity. The retention of fluid in the colon depends entirely upon the method of its administration. We have visited hospitals numbers of times and have been shown patients who were receiving the "Murphy treatment." We should not have recognized it without the label. It is difficult to impress those administering it with the importance of details, notwithstanding that the best results are secured only by close attention to detail. A fountain syringe, to which is attached a three-eighths-inch rubber hose, fitted with a hard rubber or glass vaginal douche tip with multiple openings, was the medium originally used. The tube should be flexed almost to a right angle three inches from its tip. A straight tube must not be used, as the tip produces pressure on the posterior wall of the rectum when the patient is in the Fowler position. The tube is inserted into the rectum to the flexion angle and secured in place by adhesive strips, binding it to the side of the thigh so that it can not come out; the rubber tubing is passed under the sheet to the head or foot of the bed, to which the fountain is attached. It should be suspended from six to fourteen inches above the level of the buttocks and raised or lowered to just overbalance hydrostatically the intra-abdominal pressure—i. e., it must be just high enough to require

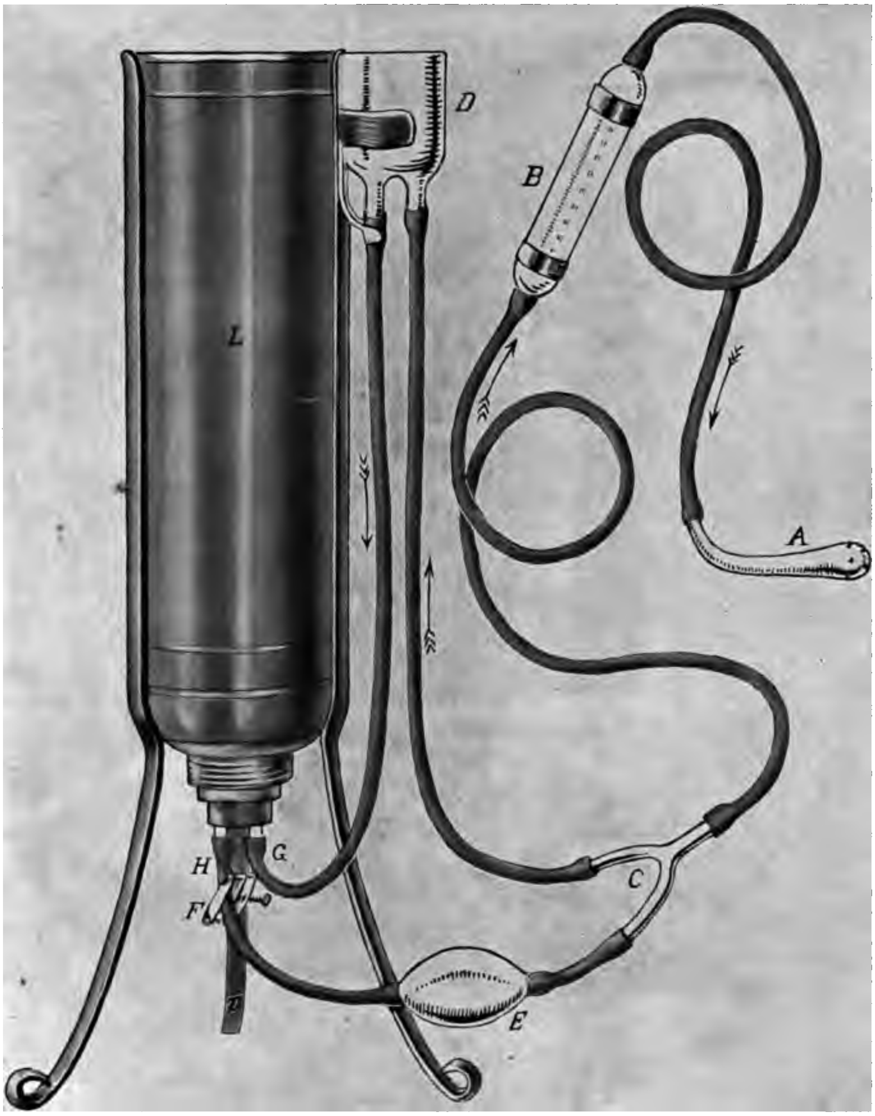


Fig. 644. Proctoclysis Apparatus in Use in Murphy's Clinic. A, rectal tip; B, tube thermometer; C, junction of rectal tube with saline tank and with tube for escape of gases and overflow; D, cup where gases escape and overflow runs back into saline tank; E, drop-bulb, where rate of flow can be watched; F, clamp for regulating flow (a clamp is permissible in this situation, but is not permissible on the rectal tube proper); G, tube from overflow cup to saline tank; H, tube from rectal tube to saline tank; J, leg of stand; L, tank (inverted vacuum bottle) for saline solution.

from forty to sixty minutes for one and one-half pints to flow in, the usual quantity given every two hours. The flow must be controlled by gravity alone and never by a forceps or constriction on the tube, so that when the patient endeavors to void flatus or strain the fluid can rapidly flow back into the can, otherwise it will be discharged in the bed. It is this ease of flow to and from the bowel that insures against overdistention and expulsion onto the linen.

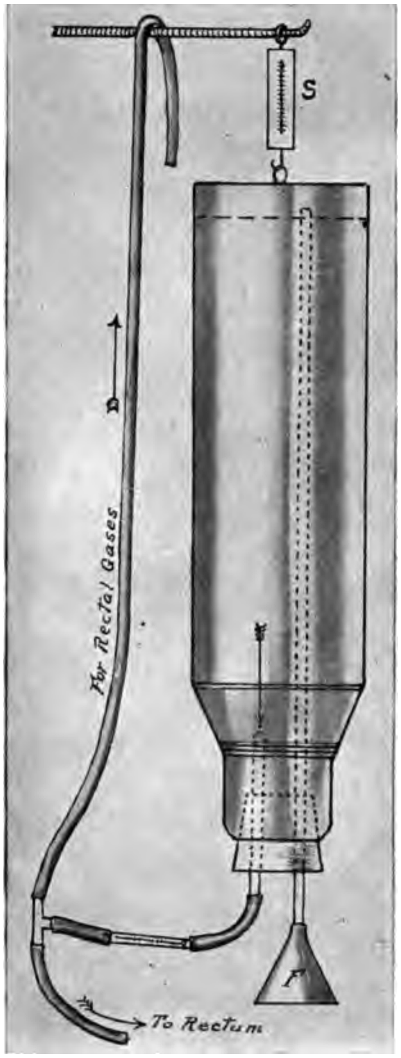
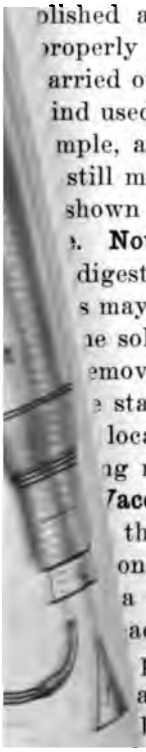


Fig. 645 A Simpler Proctoclysis Apparatus, that may be quickly improvised (R. M. Harbin). It consists of a vacuum bottle for retaining heat (this can be found in nearly every drug store), with a filling funnel (F), which extends above the fluid when the bottle is turned upside down, and an outlet tube leading to the rectal tube. A tube thermometer in this outlet indicates accurately the temperature of the solution passing to the rectum. The free escape of gases and of fluid from back-pressure when straining is provided for by the tube extending upward. The bottle is suspended by a scale (S), which shows the amount of fluid discharged.

"The fountain had better be a glass or graded can, so that the flow can be estimated. The temperature of the water in the fountain can be maintained at 100° by casement in hot-water bags. The fountain is refilled every two hours with one and one-half or two pints of solution. The tube should not be removed from the rectum for two or three days, except for bowel movement, When the nurse complains that the solution is not being retained, it is certain it is not being properly given; even children tolerate proctoclysis surprisingly well. We have administered as much as thirty pints of salt solution in twenty-four hours and it was all retained. We believe that, next to the conservative technique of the operative procedure, proctoclysis is second in importance as a life-saver. It rapidly restores blood pressure, it improves the capillary circulation, it quiets the thirst, it eliminates the septic products and increases the excretions. All of the details are simple, but they must be carried out with precision to secure the best results."



It is not necessary to have an elaborate apparatus. Dr. Murphy accomplished a large part of his splendid results by a simple fountain syringe properly arranged. The treatment can be more conveniently and accurately arried out, however, with an apparatus especially adapted to the work. The ind used in Dr. Murphy's clinic at present is shown in Fig. 644. It is fairly mple, and yet accomplishes all that is necessary and in a convenient way. still more simple form of apparatus and one that can be easily improvised shown in Fig. 645.

Nourishment Per Rectum. Give an ounce of some one of the reliable digested foods to three ounces of normal saline solution every four hours. s may be given by the drop method instead of like amount of plain normal ne solution, or it may be given as an ordinary low enema if it is desired emove the tube for a time. No large enemas are to be used during the e stage, as they might excite intestinal peristalsis. After the process is localized and the threatening symptoms have disappeared, stomach ng may be gradually resumed.

Vaccine Therapy—Serum. There are various measures that tend to in- the patient's resistance, and these aid in checking the progress of the on. In most cases the treatment already mentioned will suffice to a cure. In exceptional cases, however, the infection still continues ad and threaten the patient's life. This is seen not infrequently in puerperal infections—puerperal peritonitis, puerperal cellulitis and arly in puerperal septic thrombo-phlebitis. All surgical indications been promptly met, we are not yet through, but must use every means to increase the patient's vital resistance. There is now a onflict and in some cases a prolonged conflict between the invading and the defending forces of the body. Measures that increase sis, and strengthen the other resisting forces, aid nature in the fight decide the issue favorably. Antistreptococcic serum has seemed to ially in some cases. In spite of the fact that in many cases it has nd that a number of physicians have lost faith in it, I am not ready to give it up. When having a considerable experience in such cases, we are necessarily guided by our own observations and opinions to a large extent. I have used the antistreptococcic serum many times with no effect, but, on the other hand, I have repeatedly noted marked improvement apparently due to it—that is, due to nothing else so far as I could see. These are desperate cases, that have gotten beyond the reach of direct measures, and the control of the situation has slipped out of our grasp. This is not an occasion for theorizing. Anything that offers a substantial chance of improvement and will do no harm should be used. Consequently, until this subject is more definitely cleared up, I shall continue to use antistreptococcic serum. I use the polyvalent serum in doses of 20 c.c., one dose every 24 hours, until three doses are given. If no effect, no more is used. If a favorable effect, the administration of serum is continued at intervals as indicated by the temperature.

Vaccine therapy, as far as developed, has been effective principally in chronic infections. A few apparently favorable results have been reported in the acute infections under consideration, but these are uncertain, and its use here is wholly experimental as yet. In an infection resisting other measures it is well to try this. Autogenous vaccine is the preferable form, but, if this can not be made, then use stock vaccine—streptococcic, staphylococcic or gonococcic, as indicated by the clinical and bacteriological evidences in the case.

Employ also the various other measures used to increase or conserve the patient's vital resistance—namely, concentrated nourishment, stimulants, laxatives, sedatives, etc., according to usual indications.

6. **Septic Thrombo-phlebitis.** The nature and ramifications of this process have been indicated on pages 700, 701, and as long as the septic process is confined to accessible veins there is still a chance to limit it artificially by ligation of the affected veins proximal to the infection. This subject is still in the experimental stage. A number of patients have been operated on. Some good has been accomplished, and there is promise of more for the future. Whenever a puerperal septic patient has repeated chills and high fever, persisting after the uterus has been cleared out, and with no general lesion nor palpable local lesion to account for these manifestations, the question of septic thrombosis and possible operation should be considered. In these cases it is important also to employ the measures mentioned above for increasing the patient's resisting power.

7. In a case of apparent pelvic inflammation where the **diagnosis is doubtful,** operation may be indicated on account of the probability or possibility of some other condition, which would require operation at once—such, for example, as tubal pregnancy or appendicitis or a suppurating tumor. As a rule, in any of these conditions, if the symptoms are severe, immediate operation is necessary. Consequently, in doubtful cases, where these conditions can not be excluded, if the patient is growing worse, operation at once is indicated.

PROGNOSIS.

What ultimate results can be expected in these cases of acute pelvic inflammation? What is the after-history of these patients?

For the purpose of prognosis it is convenient to divide the cases into two classes—(A) those not requiring operation and (B) those that do require operation.

A. If the patient can be tided over the most acute stage of the attack **without operation,** one of the following terminations will take place.

1. **Complete Recovery.** In these cases the germs are destroyed, the plastic and serous exudate is absorbed, the pains disappear, the patient comes to feel well and functional activity is restored. That such a termination does take place even in some severe cases is proven conclusively by the cases of salpingitis and pelvic peritonitis, from infection following labor of abortion, in which the patients eventually recover and have good health and bear children. No doubt a few adhesions remain, but not enough to cause pain nor to interfere with function. This very desirable termination is much more liable to take place in ordinary septic inflammation than in gonorrhoeal inflammation. In gonorrhoeal inflammation the immediate danger to life is not so marked as in other forms of pelvic infection, but the ultimate danger to health in the cases that survive is much more marked. In a much larger proportion of the gonorrhoeal cases the acute trouble is followed by serious chronic pelvic inflammation, causing sterility and persistent invalidism.

2. **Partial Recovery.** Functional activity is not restored. The exudate is largely absorbed and the pains disappear, and the patient feels well. But she is sterile—the sterility being due usually to remaining infiltration and adhesions that occlude the tubes and otherwise damage them.

3. **Chronic Pelvic Inflammation.** A large percentage of the cases of acute pelvic inflammation terminate in chronic pelvic inflammation. There may be found a pelvic abscess, which requires opening and drainage by way of the vagina or removal by abdominal section. More frequently, however, there is a mass of exudate without a distinct collection of pus, but with a focus of chronic inflammation which acts as a source of constant irritation, causing pain on exertion and marked menstrual disturbance, and giving rise to frequent attacks of pelvic peritonitis.

4. **Death from Persistent Sepsis.** The patient survives the acute symptoms at the beginning of the attack, but still there continues septic absorption or there develops general pyaemia. There is irregular fever, with repeated chills if pyaemia is present, emaciation, increasing weakness and finally death, two weeks to two months from the outset of the trouble.

This result is much more liable to take place where there is serious disease elsewhere—for example, in the kidneys or heart, or lungs or gastro-intestinal tract.

b. If the inflammation is so severe that the patient's **life is threatened** and immediate **operation** is required and carried out, the following are the terminations:

1. **Complete Recovery.** Of the operative cases that survive the acute attack a large proportion are permanently cured. The patient's health may be fully restored and she is again capable of child-bearing.

2. **Partial Recovery.** The exudate is absorbed, the pains disappear and the patient has good health—but she remains sterile.

3. **Chronic Pelvic Inflammation.** In the septic cases following labor or miscarriage the troublesome post-operative lesions are usually adhesions and plastic exudate. In the gonorrhoeal cases the other tube is very liable to become inflamed and pass through the same process as the one removed. In vaginal drainage cases, whether septic or gonorrhoeal, the drainage tract may close too soon, allowing the abscess to reform, or another focus may go on to abscess formation.

4. **Death in Spite of Operation.** In many of these cases the inflammation is so virulent that no operation will stop its progress. On the other hand, in some of the most threatening cases the patient's life is apparently saved by operation.

The prognosis in regard to **pregnancy** in patients who apparently recover from acute pelvic inflammation, with or without operation, is as follows:

1. If the previous inflammation was of the **ordinary septic** variety, there is a fairly good chance of pregnancy later. Of course, such a patient is not so liable to become pregnant as a perfectly healthy woman, and if she does become pregnant she is more liable to miscarry. However, many women who have passed through one or more attacks of severe puerperal sepsis, with involvement of tubes and peritoneum, recover apparently completely and continue to bear children as though there has been no trouble.

2. If the previous inflammation was **gonorrhoeal**, involving the tubes and peritoneum, there is almost certain to be sterility. This is one of the causes of sterility in prostitutes, and it is also a cause of many childless homes. The husband, having previously had gonorrhoea and supposing himself well, married and unknowingly carried infection to his wife and thus destroyed her chance of becoming a mother. Fortunately, sterility does not invariably follow gonorrhoeal salpingitis, some patients recovering sufficiently to become pregnant.

CHRONIC PELVIC INFLAMMATION.

The inflammatory process may be situated principally in the Fallopian tubes and pelvic peritoneum, or in the pelvic connective tissue, or in the ovaries.

ETIOLOGY, PATHOLOGY, SYMPTOMATOLOGY.

In chronic pelvic inflammation the separate forms of the disease are more distinct than in the acute variety—that is, the cases may be divided into distinct groups, representing the different localizations of the inflammatory process and differing considerably in etiology, pathology and symptomatology. The cases may be divided into three groups—(A) chronic salpingitis (with complicating oophoritis and chronic pelvic peritonitis, causing peritoneal exudate and adhesions), (B) chronic pelvic cellulitis (parametritis), and (C) chronic oophoritis (cystic ovary).

(A.) CHRONIC SALPINGITIS.

Etiology.

Chronic salpingitis follows acute salpingitis. In practically every case of genital origin there has been endometritis due to infection following labor, or miscarriage, or gonorrhoea. Chronic pyosalpinx alone (without involvement of the parametrium) is nearly always due to the gonococcus, recognized or unrecognized—even in the cases in which the infection dates from a labor or miscarriage. The detailed proofs of this fact and the apparent exceptions I prefer to discuss later, along with its bearing on the operative treatment of chronic inflammatory masses in the pelvis (see pages 748 to 750). From the endometrium the inflammation extends to the tube, causing first acute salpingitis and later chronic salpingitis.

Pathology.

In chronic inflammation of the tube there are found much the same variety of pathological changes as have been mentioned under acute inflammation. However, the serous exudate (whether in the cavity or in the tissues of the tube wall) has been largely absorbed, and all active infection is confined to one or more areas which are well surrounded by plastic exudate. Any collection of pus is well walled in, and in some cases is sterile from long standing. The adhesions, which at first were simply fibrinous exudate, are now organized and contain fibrous tissue and small vessels. Some of the adhesions now become stretched into long bands or attenuated cords, owing to the constant movement of the organs. The cases may be divided in classes as follows:

1. **Mild Salpingitis** (Fig. 646). In the cases of this class the ends of the affected tube are occluded and the fimbriae matted together and distorted, and frequently adherent to the ovary or some other adjacent organ. The wall of the tube is thickened and the cavity is empty.

2. **Salpingitis with Exudate** (Fig. 647). In the cases of this class there is a mass of exudate about the tube, binding together the adjacent organs, but there is no distinct collection of pus.

3. **Pyosalpinx** (Fig. 648). The occluded tube contains pus. There may or may not be extensive exudate and adhesions. There is no pus outside the tube.

4. **Diffuse Pelvic Suppuration** (Fig. 649). In the cases of this class the pus has extended outside the tube. As the pus extends in various directions,

the exudate extends in front of it, shutting it off from the general peritoneal cavity. As in acute inflammation, this process may extend until all the pelvic organs are bound together in an irregular mass, with pus lying in the spaces between them.

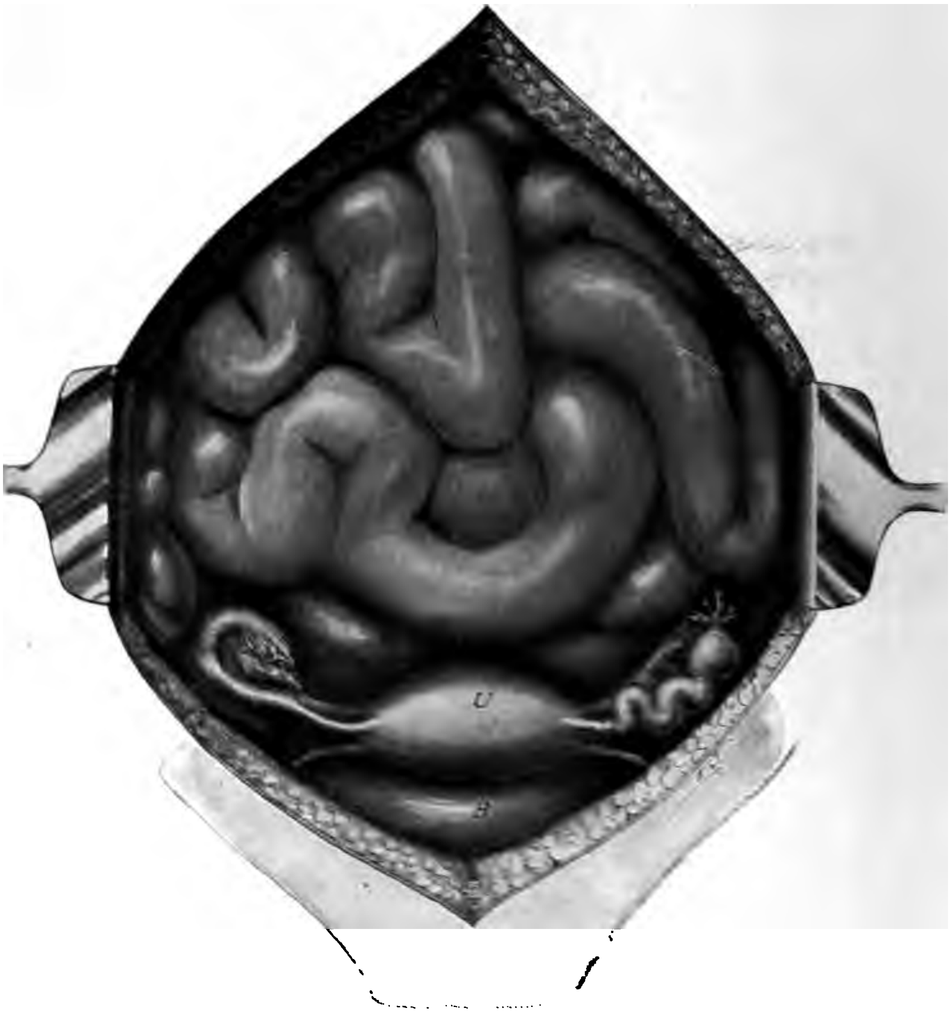


Fig. 649.—Mild Salpingitis on the Left Side. Contrast this with the normal right tube. Notice the enlargement and tortuosity of the affected tube and also the distortion of [illegible]

5. Ovarian Abscess (Fig. 650). The inflammation may extend to the ovary, forming an ovarian abscess in communication with a tubal abscess (Fig. 650, right side). More rarely there is a distinct ovarian abscess without evident pus formation in the tube (Fig. 650, left side).

6. Hydrosalpinx (Fig. 651). The tube may be much distended and contains serous fluid, but no pus. There may or may not be many adhesions.

7. **Nodular Salpingitis** (Fig. 652). The wall of the tube becomes greatly thickened, the thickening being so irregular as to give the tube a distinctly nodular appearance. Usually both tubes are affected, and frequently there is also chronic oophoritis of one or both sides.

8. **Adhesions** (Fig. 653). There is a class of cases of chronic salpingitis in which the tubal trouble is slight or has largely disappeared, but the resulting peritoneal adhesions are extensive and troublesome, dislocating the tubes and ovaries and holding them firmly in abnormal positions. In such cases all active infection may have disappeared, leaving only the sequelae, consisting of exudate, adhesions and distortions.

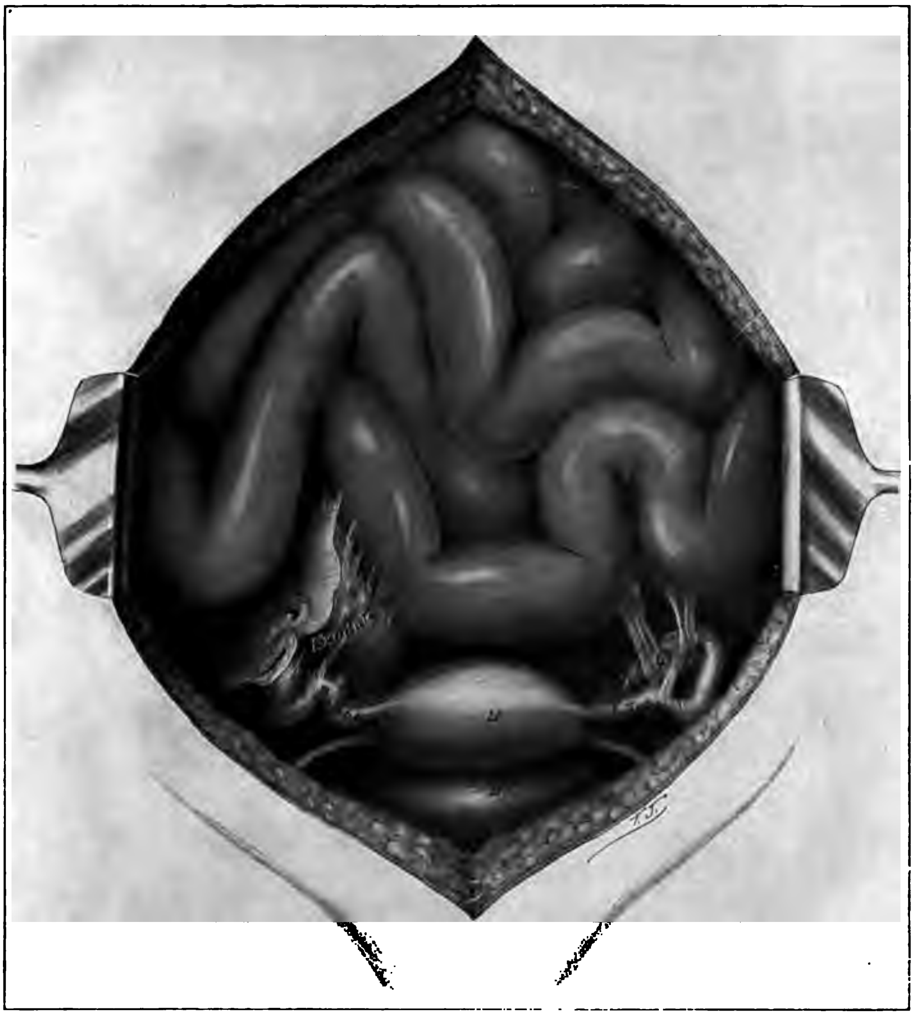


Fig. 647 Salpingitis with Exudate. On left side is indicated salpingitis with a few adhesions. On right side is indicated salpingitis with extensive exudate and adhesions. The section indicates the relation of the thickened tube, the ovary, and the surrounding exudate.

Symptoms.

The symptoms of which the patient complains in chronic pelvic **inflammation** are **backache** and **pain** in the pelvis, increased by walking or working. There is **tenderness** in the lower abdomen, usually over one or both tubes. There are decided **menstrual disturbances,** consisting of painful menstruation, prolonged menstruation and an increase of all the troublesome symptoms at the menstrual periods. The patient complains of **weakness** and loss of weight, and an inability to stand walking or working as she formerly did. **Vaginal discharge** is usually present, due to the accompanying endometritis. There

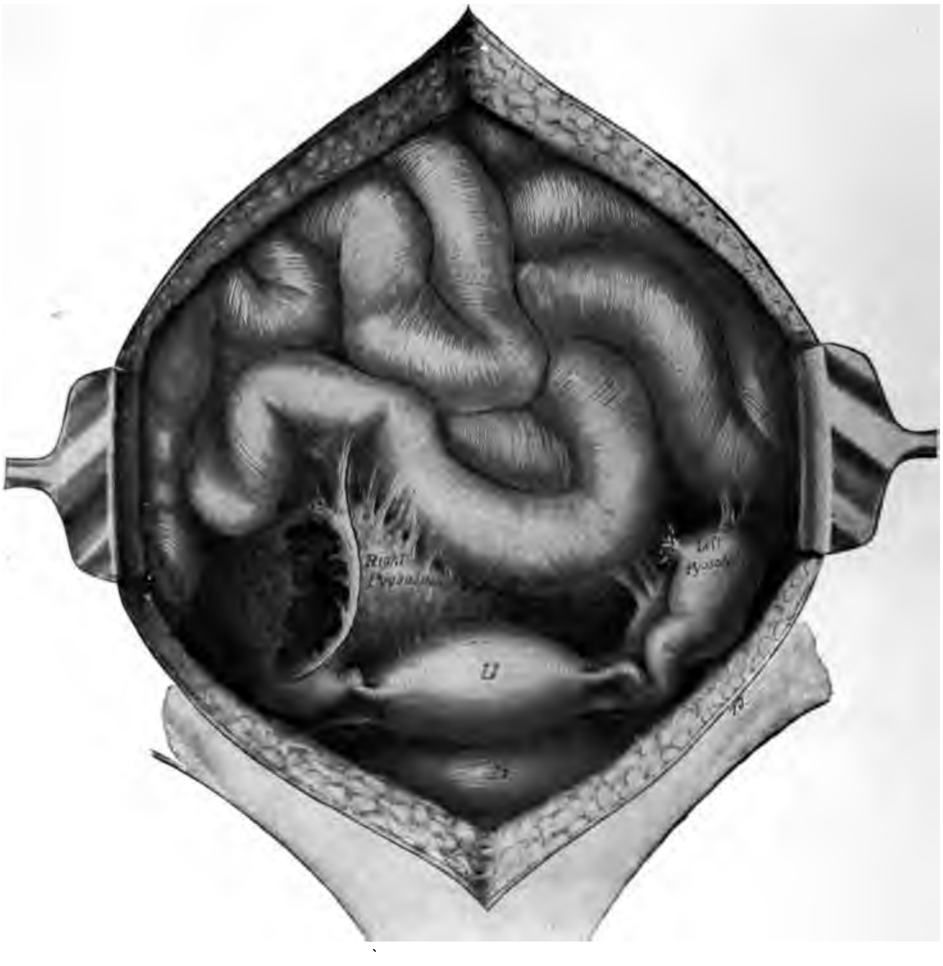


Fig. 648. Pyosalpinx. Left tube distended with pus, but with a few adhesions Right tube distended, with pus and surrounded by extensive adhesions. The section on the right side indicates the relation of the distended tube to the surrounding structures. The sectioned ovary is indicated dimly below and to the outer side of the enlarged tube, which has fallen behind and to the inner side of it.

occur also **exacerbations,** in which the patient has sharp pain and some fever, and is sick in bed from a few days to several weeks.

On examination there is found **tenderness** in the tubal region of one or both sides and in most cases **a mass** in the same region. If the inflammation is slight, there may be no mass of exudate, but simply a thickening of the affected tube. If the inflammation is more marked, there is a distinct mass beside the uterus in the tubal region, fixing the uterus to the pelvic wall.

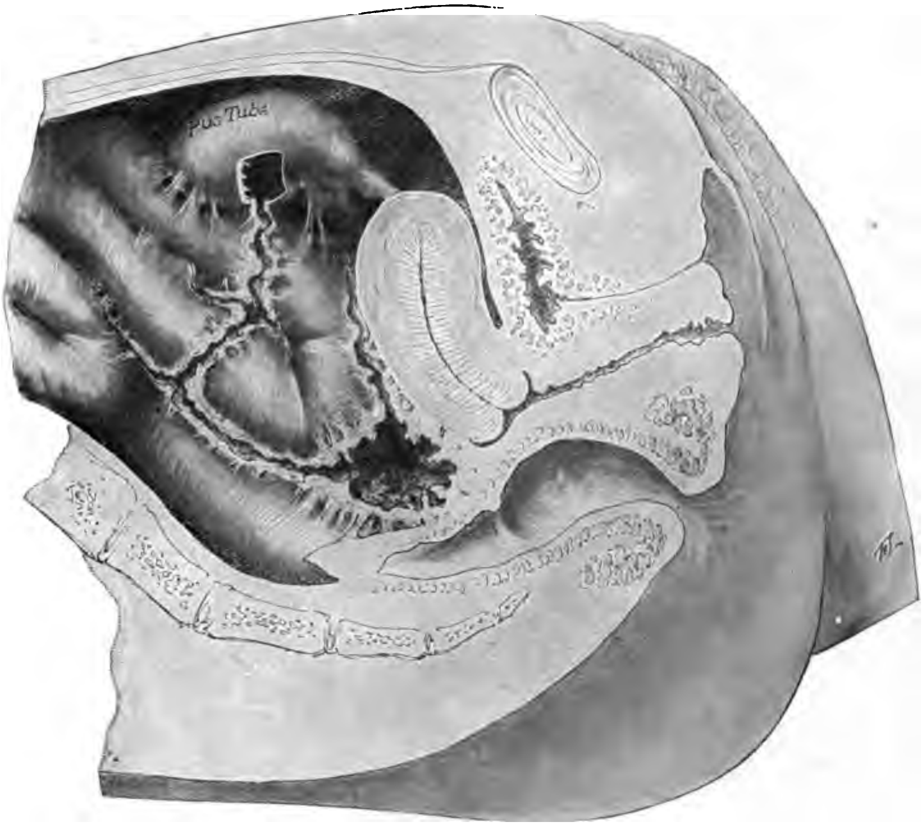


Fig. 649. Diffuse Pelvic Suppuration from Pyosalpinx. The pus has broken through the tube wall, spread among the intestinal coils and gravitated to the cul-de-sac. A window, cut in the distended tube, shows the connection of the suppurating tract with the tubal cavity.

If the inflammation is still more marked, the posterior cul-de-sac contains a mass of exudate, or the whole pelvis may be filled with a mass, which forms a wall above the plane of the vagina (Figs. 401, 402), and the uterus is fixed immovably in this roof of exudate. The exudate is tender when pressed upon and, if there is a large **collection of pus,** fluctuation may be felt in the cul-de-sac of Douglas or in the tubal region of one side. The uterus is fixed, and attempts to move it cause pain. The amount of **fixation** or limitation of movement depends, of course, on the extent of the exudate and adhesions.

The cases of chronic salpingitis frequently present also complications—laceration of pelvic floor, laceration of cervix, retroversion of uterus and chronic endometritis. These conditions should be searched for and noted, for they must be taken into consideration in the treatment.

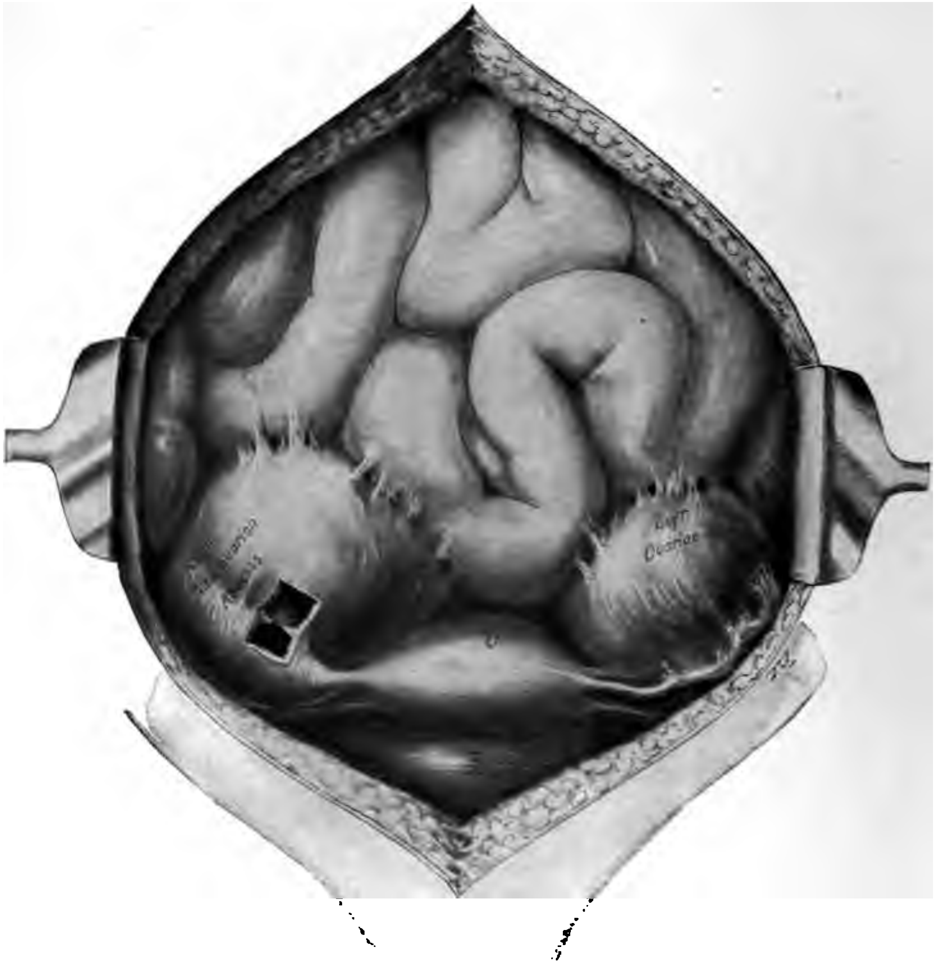


Fig. 630.—Ovarian Abscess. A window, cut in the wall of the abscess on the right side, shows that it is composed of a tubal portion and an ovarian portion (tubo-ovarian abscess), and a communication between the two cavities. On the left side is indicated an abscess involving the ovary only, which is a much rarer condition.

B. CHRONIC PELVIC CELLULITIS (PARAMETRITIS).

This is chronic inflammation of the connective tissue surrounding the uterus. There is usually more or less secondary infiltration of the connective tissue in all extensive pelvic inflammations, and sometimes pus of tubal origin will make its way into the connective tissue. But most of the cases of well-marked cellulitis are due to extension of infection directly from the uterus into this region.

Etiology.

Chronic cellulitis is due to a preceding acute cellulitis and consequently has the same causative factors. It is usually due to infection following labor or miscarriage, the bacteria passing directly through the wall of the uterus into the connective tissue or through tears of the cervix. In other cases it can be traced to operation on the cervix, to operation within the uterus, to instrumental examination of the interior of the uterus, or to attempts a

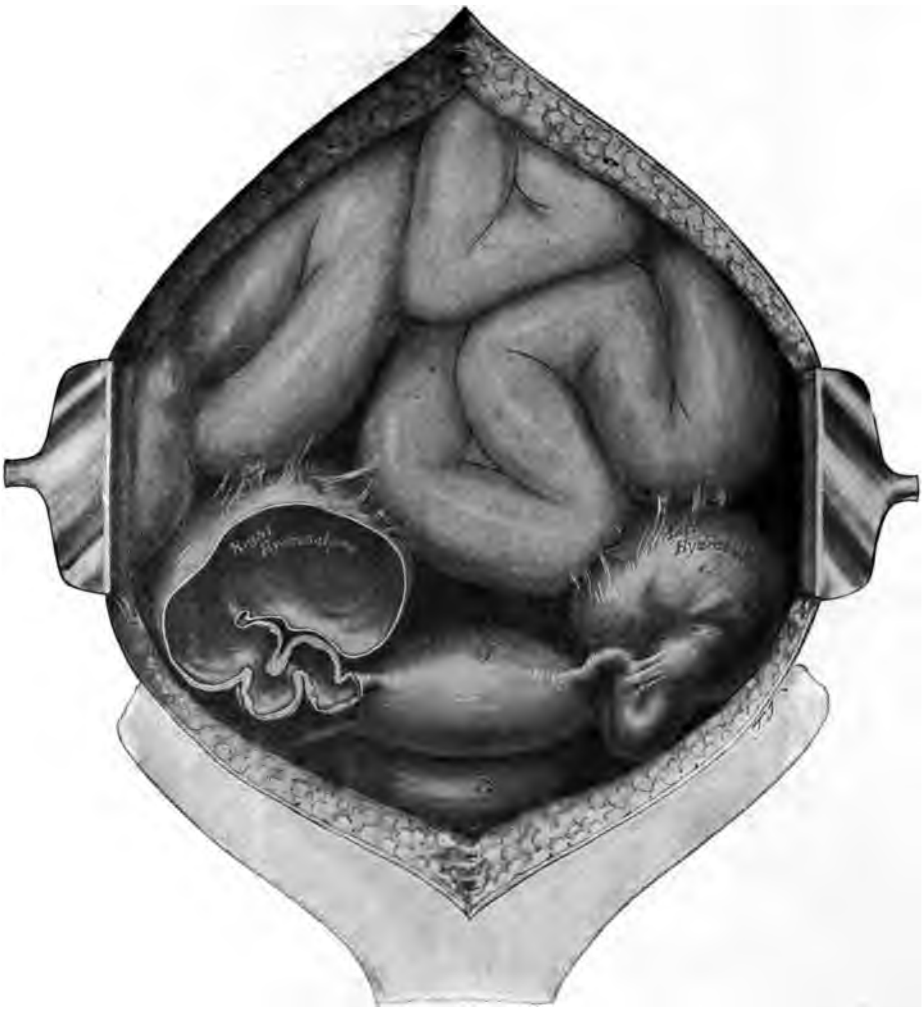


Fig. 651. Double Hydrosalpinx. The sectioned right tube indicates clearly the marked thinning of the wall found in these cases.

abortion. Cellulitis alone (without tubal involvement) is usually due to the streptococcus, staphylococcus or colon bacillus—practically never to the gon-

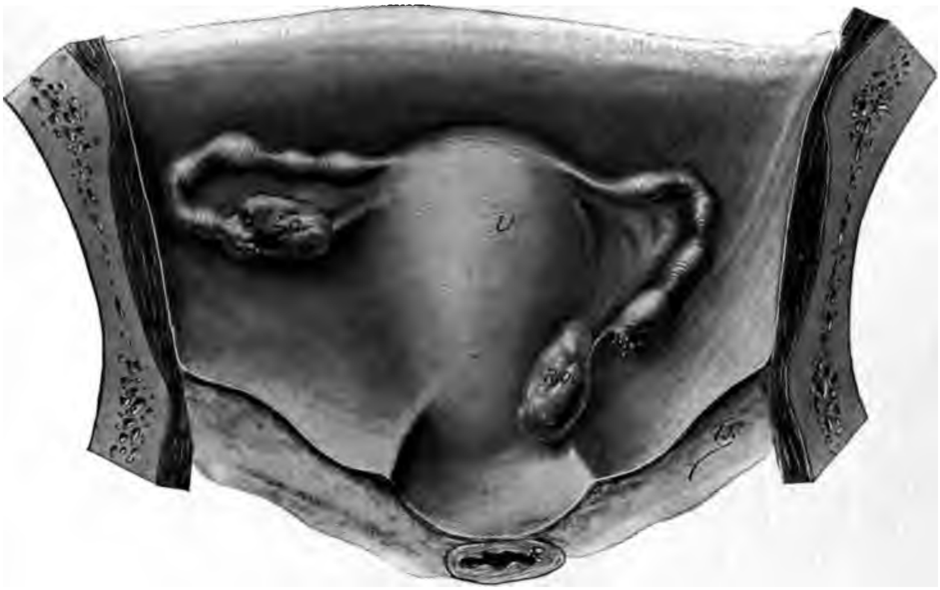


Fig. 652. Nodular Salpingitis. This form of chronic salpingitis is usually bilateral, and is often accompanied by prolapse of the tube or ovary on one or both sides.

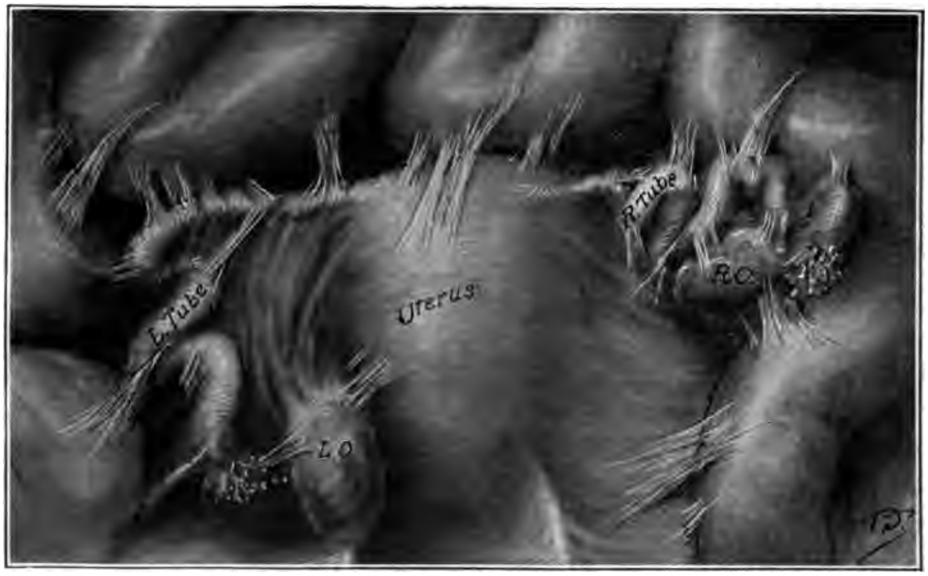


Fig. 653. Multiple Adhesions from Chronic Pelvic Inflammation. This illustration represents a posterior view of the pelvic organs, with the intestinal coils pushed upward and to the sides to show the numerous adhesions.

ococcus. This point is further discussed under the subject of the operative treatment of these masses.

Pathology.

Pelvic cellulitis, like inflammation of connective tissue elsewhere, is essentially an acute or subacute lymphangitis, running its course and ending in resolution or abscess formation, or a mass of unabsorbed exudate and infiltration, which may or may not conceal a focus of pus in its interior. Occasionally the infection will progress through the wall of the uterus as a thrombophlebitis and later break through the broad ligament veins into the connective tissue. The condition in any particular case may vary from a small area of induration on one side of the cervix to extensive induration, involving the connective tissue all around the uterus and extending out to the pelvic wall on each side (Fig. 654). The process may extend forward into the connective tissue beside the bladder, or backward along the sacro-uterine ligaments. Fig. 655 shows various situations in which the mass may be found.

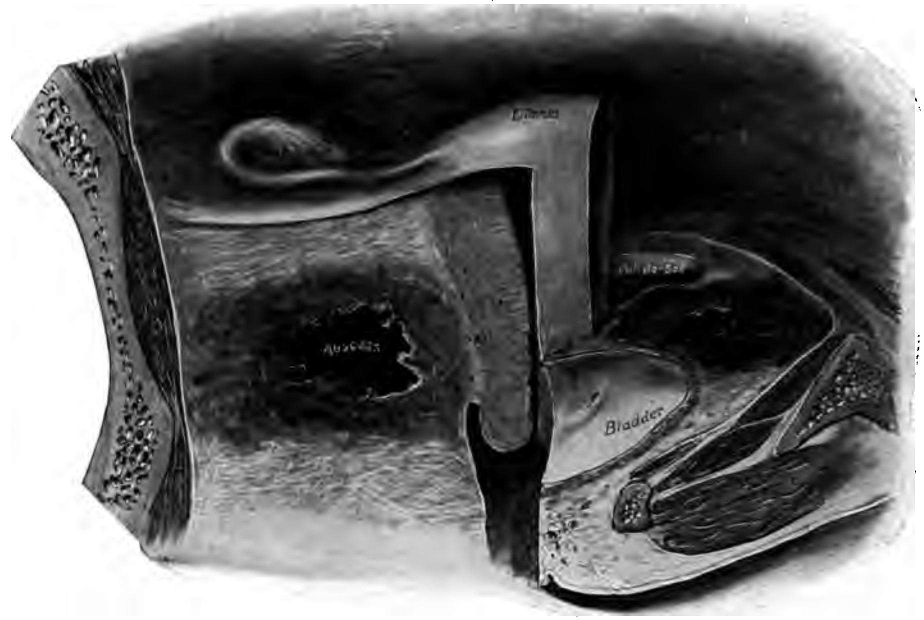


Fig. 654. Pelvic Cellulitis (Parametritis.) The broad ligament inflammatory mass is represented as sectioned longitudinally on the right side and transversely on the left side. The former (right side of pelvis) indicates how the infiltration extends down along the cervix and vaginal wall, and the latter (left side) indicates how it extends forward to the bladder and backward to the peritoneal cul-de-sac, causing a convexity toward the cavity of the cul-de-sac.

Symptoms.

The **symptoms** are much the same as those due to salpingitis—namely, backache, pain in the lower abdomen, tenderness in pelvis and menstrual disturbances. The severe exacerbations, so characteristic of salpingitis, are not present usually in cellulitis, unless there is complicating salpingitis.

On examination, **induration of extreme hardness** is felt very low in the pelvis and closely attached to the sides of the cervix—the portion of the uterus in contact with the connective tissue (Fig. 654). The marked induration may extend out to the pelvic wall, and may be so intimately attached to the bone and so hard as to appear to be a bony or cartilaginous outgrowth from the wall of the pelvis. Other points in the differential diagnosis between a parametritic mass and a tubal mass are given on page 753. In some cases in which it is difficult to determine certainly whether the induration is in the connective tissue or about the tube, the history of the trouble—its cause and subsequent course—will help in distinguishing between the two.

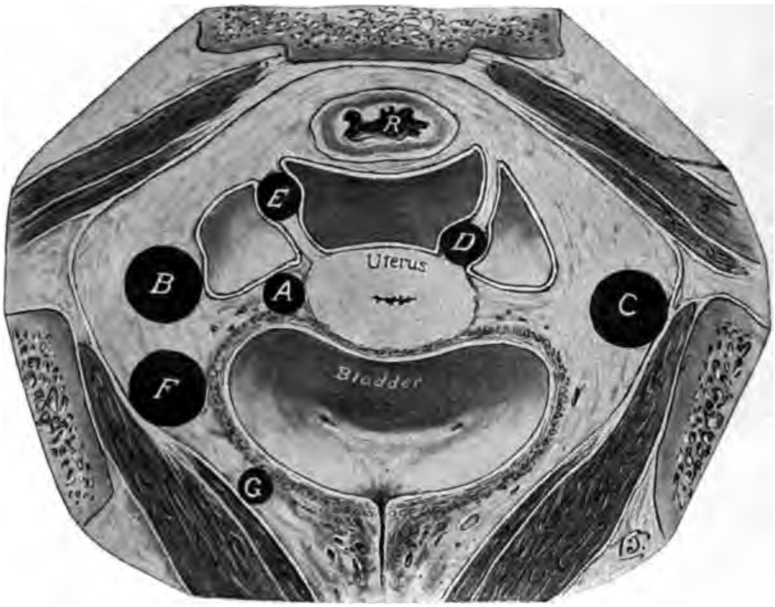


Fig. 655. Indicating the Various Situations in which a Parametritic Mass may be found. A, close to the side of the cervix; B, at the middle of the broad ligament; C, at the outer portion of the broad ligament; D, in the sacro-uterine ligament close to the cervix; E, in the posterior portion of the sacro-uterine ligament; F, at the side of the bladder; G, in the anterior portion of the pelvis.

(C.) CHRONIC OOPHORITIS.

Chronic inflammation of the ovary may be secondary or primary. Secondary inflammation of the ovary is due, as a rule, to extension from a salpingitis. The inflammation about the outer end of the tube involves the adjacent peritoneum and ovary. When this takes place the following conditions in the ovary may result:

1. One or more points of infection, with inflammation, infiltration and

swelling—the inflammation involving both the follicles and the interfollicular connective tissue. It may or may not progress to the stage of abscess formation. When an ovarian abscess forms, it is usually in connection with tubal suppuration, hence it was considered along with salpingitis (page 730) and Fig. 650).

2. The ovary, instead of becoming infected, may simply become surrounded by exudate, which compresses it, damaging it and causing cellular infiltration of the connective tissue (both the capsule and stroma). In time this round cell infiltration forms scar tissue, and as it contracts it further interferes with the Graafian follicles, so that they atrophy or form small cysts. From this process the functionating part of the ovary becomes reduced in size, and the organ may come to consist simply of a mass of fibrous tissue with small cysts scattered through it. This condition is called cirrhosis, and ovaries thus affected are designated as "cirrhotic ovaries."

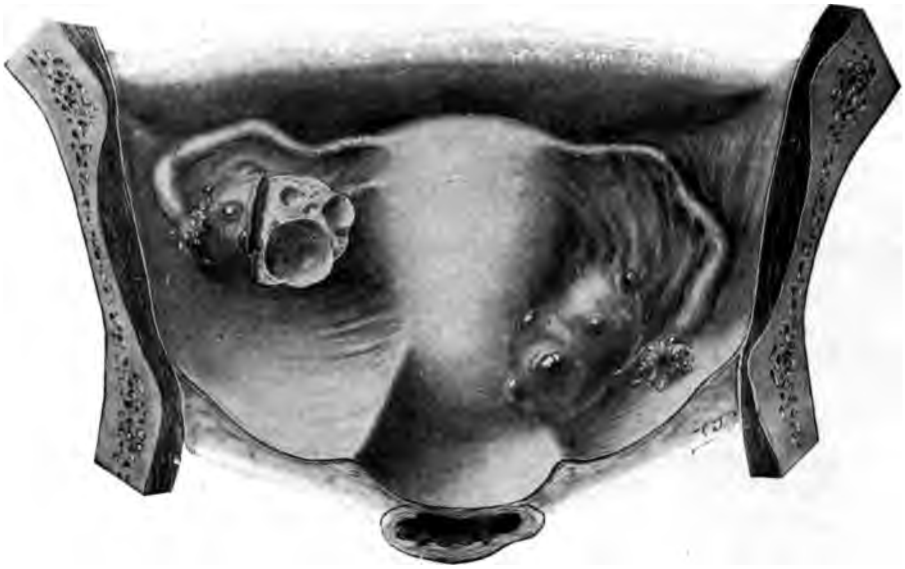


Fig. 656. Cystic Ovary. This affection is usually bilateral, and the chronically inflamed and heavy ovary is often prolapsed.

Primary inflammation of the ovary is due to infection carried by the blood or to active hyperaemia (from excessive sexual excitement or suppression of menses), or to interference with the circulation (from malposition, or from chronic inflammation of the uterus or tubes, or from a tumor of the uterus, or from other pelvic tumor). In the case of infection the inflammation runs the same course as in oophoritis, secondary to salpingitis.

In the case of oophoritis due to circulatory disturbance without infection, the process is really not inflammation, but a nutritive disturbance accompanied with chronic irritation. There is chronic congestion of the ovary, round-cell infiltration and enlargement, with dilatation of the Graafian follicles. This produces a large, heavy, tender "cystic ovary" (Fig. 656). The heavy ovary is very liable to sink down back of the uterus, low in the pelvis, a condition known as "prolapse of the ovary." Later, owing to the contraction of the newly-formed connective tissue, the ovary may shrink and become cirrhotic.

The normal changes in the ovary, incident to the rupture of the Graafian follicles and subsequent scar formation (see Chapter XII), produce appearances which are sometimes mistaken for inflammation.

The **symptoms** of infective inflammation of the ovary are about the same as those of salpingitis. In the non-infective inflammatory disturbances above referred to (hyperplasia of ovary, cystic ovary, cirrhotic ovary, prolapse of ovary) the symptoms are much the same as in a chronic salpingitis, but without the severe exacerbations, confining the patient to bed for one or two weeks. The symptoms approach those of a neuralgic rather than an inflammatory character. The patient is rarely, if ever, confined to bed more than a few hours, except in some cases at the menstrual periods. Examination shows no mass of exudate about the tube, but one or both ovaries are enlarged and very tender, and possibly prolapsed. In a later stage the enlarged ovary may shrink and become smaller than normal (cirrhotic ovary).

DIFFERENTIAL DIAGNOSIS OF CHRONIC PELVIC INFLAMMATION

The diseases which may be confounded with chronic pelvic inflammation, and which therefore must be taken into consideration in the differential diagnosis, are as follows:

Chronic endometritis.
Fibromyomata of the uterus.
Tubal pregnancy with chronic symptoms.
Tuberculosis of the tubes and peritoneum.
Syphilis of the pelvic structures.
Ovarian and broad ligament tumors.
Chronic appendicitis.
Mucous colitis.
[illegible]
[illegible]
Neurasthenia.
Hysteria.

In **chronic endometritis** [illegible]

Fibroid tumor [illegible]

[illegible]

[illegible]

d. There is not the marked tenderness that is found in pelvic inflammation.

e. There is no fixation unless the tumor is large enough to impinge on the pelvic wall. The uterus and tumor are movable together, but not separately.

f. If necessary to sound the uterus, it will usually be found increased in depth.

Ovarian and **broad ligament tumors** present the following characteristics:

a. Gradual onset of symptoms.

b. Absence of fever and of marked menstrual disturbance and of severe attacks of pelvic peritonitis.

c. Large tumor mass without particular tenderness and without fixation. In the case of an ovarian tumor the mass can usually be moved about in the lower abdomen.

d. Distinct fluctuation without marked tenderness, indicating that the fluid is not pus.

Tuberculosis of tubes and peritoneum. The distinguishing characteristics of tuberculosis of the tubes and peritoneum are:

a. Decided symptoms of pelvic inflammation in a young woman who has had no opportunity to contract pelvic inflammation—that is, in a woman who has never had endometritis.

b. Gradual onset, usually, and persistent progress without the marked improvement usually following the treatment of ordinary pelvic inflammation.

c. Encysted ascites—a collection of fluid shut off from the general peritoneal cavity by adhesions—without the marked pain and fever that would come with a collection of pus.

d. Evidence of tuberculosis elsewhere.

c. Emaciation, gradual, but marked and persistent—more so than would be accounted for by the pain, fever, etc.

Syphilis of the tubes and peritoneum sufficient to cause symptoms is rare, but it should always be borne in mind in patients presenting marked evidence of syphilis, especially if there is severe ulceration of the genitals or rectum or if there is stricture of rectum. All such patients presenting symptoms of chronic pelvic inflammation should be given a thorough course of potassium iodide before operation is decided upon.

It is the cellular deposit of the tertiary stage that attacks these structures. The symptoms pointing to such trouble are:

a. Evidence of syphilis elsewhere in the body.

b. Gradual onset of the trouble, usually in connection with some other active evidence of syphilis in the third stage.

c. Less decided fever and tenderness than in ordinary inflammation.

d. No fluctuation, but extensive adhesions, which bind the organs together in such a way as to form distinct masses, which may be mistaken for masses of plastic exudate.

e. The recently developed reactions for syphilis (Wassermann, Noguchi) and, where a portion of affected tissue can be excised, examination for the spirochete pallida.

Though this syphilitic condition in the pelvis is rare, it occasionally occurs and must be watched for in syphilitics. In more than one such patient the abdomen has been opened, only to find the case not a proper one for operation—the abdomen being closed and the patient placed on anti-syphilitic treatment, which should have been given before operation.

Chronic **appendicitis** may be difficult to differentiate from chronic salpingitis of the right side. The facts pointing to appendicitis are as follows:

a. High location of the painful area, at McBurney's point, without a painful area at the site of the Fallopian tube.

b. Stomach and intestinal disturbance, preceding and accompanying an attack. Also pain in region of the umbilicus, rather than in the back.

c. High location of the mass of exudate—not felt so well from vagina as would be a mass about the Fallopian tube.

d. Absence of endometritis and absence of a history of previous uterine sepsis or gonorrhoea.

e. No marked increase of the trouble at the menstrual periods. Even appendicitis may show some increase then, but it is not so marked as in salpingitis.

In a case of inflammation in the right lower abdomen in a girl, or in a woman who has never been pregnant nor had any uterine infection, the trouble is more likely to be appendicitis. On the other hand, in a case of inflammation in that locality in a woman who has once had infection of the uterus, the probability is in favor of salpingitis. In some cases it is impossible to make a positive differential diagnosis until the abdomen is opened. In fact, it not infrequently happens that both structures are involved in the inflammatory process, the inflammation beginning in the tube and extending to the appendix or beginning in the appendix and extending to the tube.

Other **intestinal diseases** also must be excluded. Mucous colitis is the one which has most frequently been mistaken for chronic tubal or ovarian inflammation (see page 300). The points that distinguish mucous colitis from chronic pelvic inflammation are (a) the character of the pain (resembling intestinal cramps and extending throughout the lower abdomen), (b) the passage of characteristic masses of mucus in some of the attacks and (c) the absence of any palpable pelvic lesion.

There are also diseases of the **urinary organs** that may be confounded with chronic pelvic inflammation. All these affections must be excluded by a knowledge of the symptoms and signs that accompany them.

In **pelvic neuralgia** and in neurasthenia and in hysteria, without complicating pelvic inflammation, there is no abnormal mass within the pelvis. In pelvic neuralgia the tenderness may be localized along the pelvic nerve trunks (Figs. 87, 88).

TREATMENT.

In the treatment of chronic pelvic inflammation (chronic salpingitis, chronic oophoritis, chronic pelvic peritonitis, chronic pelvic cellulitis, and all combinations of these lesions) there are certain general measures that are applicable to practically all cases, and there are also special measures that are applicable to special conditions only.

GENERAL MEASURES.

1. **Laxatives** as needed to overcome chronic constipation. Cascara sagrada is an excellent laxative for this purpose after the bowels have been thoroughly moved by some more active purgative. I have used with much satisfaction the laxative pills containing aloin, belladonna, strychnia and cascara (see Formulae), one pill each night or one each night and morning.

2. **Attention** to the **general health,** as indicated by anemia, lithemia or other abnormal condition. This is particularly important in chronic pelvic diseases if satisfactory results from treatment would be secured. Just because the patient has some pelvic disease, do not jump at the conclusion that treatment of that alone will cure her. There may be an affection in some other part of the body that has far more to do with the patient's ill health. And even considering the effect on the pelvic affection only, the general health should be built up as much as possible.

3. **Rest** at the menstrual periods. If the patient suffers much, she should go to bed and have hot applications made to the lower abdomen. If this does not give relief, she should be given sedatives as necessary, but avoid opium.

4. **Hot vaginal douches,** one to three times daily. To secure the best result, these must be given according to the special directions detailed in Chapter III.

5. **Applications** to the **vaginal vault.** Ichthyol (10 per cent.) in glycerine, and applied by means of tampons every second or third day, aids some in relieving the pain and hastening the absorption of the exudate.

6. **Applications** to the **lower abdomen.** These consist principally in counter-irritation by means of tincture of iodine applied over the tubo-ovarian region of one or both sides. This is useful particularly in chronic or subacute oophoritis and in ovarian neuralgia. The patient is given a prescription for an ounce bottle of the tincture and a camels-hair brush. She is directed to paint the iodine over the painful region once daily until the skin becomes tender, then stop for a few days until the skin irritation subsides, then use the iodine again until the skin becomes tender, and so on as long as desired. By this means mild counter-irritation may be kept up over the painful ovary for weeks, with decided diminution of pain in some cases.

SPECIAL MEASURES.

1. If there is a collection of **pus low** in the pelvis, open and **drain** it by vaginal operation, according to the technique given in detail under acute

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SPECIAL MEASURES.

1. If there is a collection of **pus low** in the pelvis, open and drain it by vaginal operation, according to the technique given in detail under acute

pelvic inflammation (see page 705). In the after-treatment the drainage-tube will have to remain in longer than for an acute abscess of the same size, for the chronic abscesses have thicker walls and hence collapse more slowly.

2. If there is an inflammatory mass high, which probably contains pus or which continues to give serious trouble after a thorough trial of the general measures (that is, after those measures have been used faithfully for several weeks along with rest in bed as thought best), then comes the question of abdominal operation. Intimately associated with this is another important question, namely:

What is the Preferable Time for Abdominal Operation for a Chronic Inflammatory Mass in the Pelvis?

In a considerable proportion of the cases of chronic suppuration in the pelvis the pus is sterile at the time of operation. In 634 cases examined bacteriologically (collected by Andrews and comprising series by Charrier, Hartman and Morax, Kelly, Koch, Legros, Martin, Menge, Orthmann, Prochownik, Reichel, Schaffer, Schauta, Schenk, Schmitt, Stemann, Strassmann, Wertheim, Westermark, Whiteside, Witte, Zweifel, Rist, Mackenrodt, Durck, Bellei, Walsh, Frommel, and Andrews) the results, excluding tubercular cases, were as follows:

Sterile	55.	per cent.
Only saprophytes	6.	per cent.
Gonococcus	22.5	
Streptococcus and staphylococcus	12.	
Pneumococcus	2.	
Bacillus coli communis	2.5	

In a later resumé, by Hyde, comprising nearly three thousand cases (2973 cases, excluding tubercular), the bacteriologic findings were approximately as follows: sterile, 1998; gonococcus, 579; other bacteria and mixed infections, 456.

It is interesting to note the steps in the development of this knowledge. Long ago it was observed that, of the patients subjected to abdominal operation for pelvic suppuration, the old cases usually recovered promptly, while the recent cases frequently developed fatal peritonitis—that is, operation in the acute stage was far more dangerous than operation in the chronic stage.

The splendid advance in gynecologic work in the last few decades is based on facts ascertained in two ways. Some facts came to the surface largely through pathologic and bacteriologic investigation, while others were ascertained by experience at the operating table and the bedside. The fact above referred to belongs to the latter class; it was learned by experience, often bitter experience, and many lives were lost before the lesson was fully learned.

This fact, after having been clinically established, was the occasion of much curiosity, as the explanation was not at hand. It seemed paradoxical that long continuance of a debilitating disease should put the patient in better condition for a serious operation for the same.

What could be the explanation? Why did chronic inflammation confer such immunity from peritonitis after operation? One early theory was that the immunity was due largely, if not wholly, to the local effect on the adjacent peritoneum, choking its absorptive channels so that serious septic absorption could not take place so readily, and modifying the membrane so that it was not as good culture ground for the bacteria. According to another hypothesis the body resistance generally became "accustomed" to the local irritation in the pelvis and consequently was less disturbed by the added irritation of operation, and also, owing to the preparedness, so to speak, of the general resistant forces of the body, they were better able to combat invasion. These explanations were but gropings in the dark, but nevertheless they contained truths which have been verified and elucidated by the epoch-making investigation into the resistant functions of the leucocytes and the blood-serum, and into the modus operandi of antitoxin and vaccine therapy.

The decisive step in the solution of the riddle was the inauguration of systematic bacteriologic examination of specimens removed in operations for pelvic suppuration. These bacteriologic examinations were undertaken primarily for the purpose of determining the etiology of salpingitis, particularly what proportion of the cases were due to the gonococcus and what proportion to other bacteria. The results were disappointing. In a considerable proportion of the cases no bacteria could be found and hence in those cases the etiology of the trouble could not be bacteriologically determined. But, though disappointing so far as concerned the definite etiological classification of cases, the facts thus ascertained were very illuminating in regard to the important and puzzling question as to why immunity was secured by waiting. In many cases the bacteria had died and disintegrated and the pus was sterile—that was the reason why serious inflammation seldom followed abdominal section for old tubal abscesses, even though considerable pus often escaped among the pelvic structures during the enucleation. On the other hand, in fresh cases the least peritoneal contamination by the contained pus was often followed by fatal peritonitis because the bacteria were not dead, but active and virulent. Another fact ascertained was that in many of the old cases in which bacteria were still present they were so attenuated that the pus was practically sterile.

Persistence of Virulence—Classification of Cases.

It having been established that sterilization gradually takes place within a reasonable time in most cases, the next problem is to determine the period of time required for the automatic sterilization or effective attenuation in the different classes of cases.

The persistence of virulence depends largely on the character of the infection. The two principal infectious agents in pelvic inflammatory masses are the gonococcus and the streptococcus. These two differ widely in the persistence of virulence and also in certain clinical characteristics which can be distinguished before operation.

For the purpose, then, of considering the persistence of virulence in a practical way—i. e., as a guide to treatment—the cases of chronic pelvic suppuration (tubercular excluded) may be divided into two classes—the gonococcic and the streptococcic. To be useful, this classification must be made before operation—that is, it must be a clinical rather than a strictly bacteriological classification. Of course, from a bacteriologic standpoint there are other cases, due to other bacteria, but in the present state of knowledge these other cases can not, as a rule, be distinguished before operation, and, even if they were distinguished, not enough information has accumulated to show the average persistence of virulence in such cases. Consequently, when confronted with a case of non-tubercular chronic pelvic inflammation, the endeavor should be to decide whether it belongs to the gonococcic or streptococcic class, ignoring for the time the fact that it may possibly be due to other bacteria, which in point of virulence lie between these two extremes.

How may the gonococcic and the streptococcic cases be distinguished before operation? What diagnostic facts are available at that time? Bacteriologic examination of the urethral or uterine or other discharge is of assistance in only a small proportion of these chronic cases, for as a rule the bacteria have disappeared from the discharge. Neither is there at present any well-established specific diagnostic reaction in gonococcus or streptococcus cases corresponding to the tubercular reaction in tubercular cases. Hence we must depend on other information obtainable before operation. Fortunately the gonorrhoeal cases and the streptococcal cases differ usually in two particulars—namely, (a) in the apparent cause of the trouble and (b) in the location of the lesion. As a rule these distinguishing points may be settled and the case definitely classified by an accurate inquiry into the onset of the trouble and a careful bimanual examination.

Uncertain cases are to be classed with one or the other, as the preponderance of evidence warrants, and are to be given treatment accordingly. After operation, bacteriologic examination may show other bacteria, either alone or associated, and, if accurate records are kept of the histories and bacteriologic findings in large series of cases, it may be possible later to form a third clinical class, comprising one or more of the miscellaneous or mixed infections. For the present, however, the two classes, gonococcic and streptococcic, are all that can, as a rule, be satisfactorily distinguished before operation.

Gonococcic Class (Clinical).

In the gonococcic class (clinical) the distinguishing points are: (1) that the pelvic inflammation is preceded by evidence of gonorrhoea or comes on without apparent cause, and (2) that the lesion is located in the tube, extending thence to the ovary or adjacent peritoneal surfaces, but not involving the connective tissue (parametrium) to any decided extent. As so much diagnostic importance is attached to these two points, it is necessary to consider them somewhat in detail.

a. Apparent **cause** or mode of onset. As a general proposition it may be said that the gonococcus is the only germ that will spontaneously invade the normal, non-puerperal uterus and tubes. There are exceptions. Reidel reported that of 56 girls under ten years of age operated on for appendicitis, five had peritonitis due, not to appendicitis, but to acute salpingitis. He states positively that the infections reached the tubes by way of the vagina and uterus, and that gonorrhoea was excluded in every case. Cultures showed the ordinary pus germs. The inflammation was virulent and every patient died in spite of operative treatment. He observed the same clinical picture in two girls past ten years of age, both of whom died. In contradistinction to these cases in children, he states that he has never seen such penetration of normal genitalia by streptococci or staphylococci in the adult.

General experience is in accord with this statement in regard to adults. Purulent inflammation beginning in a normal adult non-puerperal vagina or uterus, and later extending out into the pelvic cavity, may be set down as almost certainly gonorrhoeal. The patient must of course be questioned closely enough to eliminate an early miscarriage and also any intrauterine instrumentation (curetment, intrauterine treatment, sounding in examination, etc.) The probability of gonorrhoea is increased if the purulent discharge ("free leucorrhoea") began within a few weeks after marriage. Again, in a large proportion of the cases of gonococcal leucorrhoea there is urethritis, causing burning on urination and increased frequency of urination. This discharge and disturbance of micturition may last a few days or much longer. It may precede the pelvic inflammation by a few days or a few weeks or a few months. A history of abscess of one of the vulvo-vaginal glands has about the same significance as a history of urethritis. These structures are frequently involved in gonococcal leucorrhoea, but very seldom in leucorrhoea from other causes.

In those cases where the vaginal and uterine gonorrhoea did not cause sufficient disturbance to be noticed, the pelvic inflammation began without apparent cause. A considerable proportion of the gonorrhoeal cases give such a history. Here, again, one must be careful not to overlook an early miscarriage or some intrauterine instrumentation. Also, it is important to trace the inflammation back to its very beginning, for some cases of puerperal infection are very mild in outward manifestations and do not cause much trouble until there is an exacerbation after several weeks or months. In these cases, however, there is usually a history of some disturbance during the puerperium, from which the patient recovered to a large extent, but not entirely. On the other hand, an inflammatory trouble, at first apparently due to a miscarriage or full term delivery, may on careful questioning be found to antedate the pregnancy and to be due to a preceding gonorrhoeal infection.

In the examination a search should be made about the external genitals for evidences of an old gonorrhoea—signs of previous inflammation of the urethra or of the vulvo-vaginal glands, such as red spots (maculae gonorrhoea) in these situations, or secretion that can be pressed from the structures. Bacteriologic examination of discharge from the urethra, vulvo-vaginal glands, vagina or cervix may show gonococci. Negative findings, however, do not exclude gonorrhoea, for in many of the chronic causes the causative bacteria have disappeared from the discharge.

In a certain proportion of cases of gonococcic pelvic inflammation the extensions of the gonococci into the uterus and beyond took place during the puerperium. It has been shown that the gonococcus may lie practically dormant in the lower part of the genital tract for a long time and extend upward after a labor or miscarriage. Sanger examined 389 pregnant women and found the gonococcus in 100. Steinbuckel examined the lochia in 274 women in which the puerperium was normal and found the gonococcus in 18 per cent. In Leopold's clinic, 25 per cent of the puerperal infections were of gonorrhoeal origin. In 179 cases of puerperal sepsis examined bacteriologically by Kronig, 50 cases were gonococcal, 50 belonged to the sapraemic group (miscellaneous saprophytes, most of which did not grow in ordinary culture media) and 79 were due to the ordinary pus bacteria. Puerperal infection due to the gonococcus is nearly always of a mild type, as shown in an instructive article by Taussig. A history indicating that the attack of puerperal sepsis was mild may help some in differentiation, though it must be kept in mind that puerperal infection from other bacteria may also run a mild course. In the cases of puerperal origin, therefore, without positive evidence of gonorrhoea, the decision must rest largely on the location of the lesion.

b. Location of the lesion. The extension of gonorrhoeal inflammation is almost invariably along the uterine mucosa into the tube (Fig. 657), and any further extension is toward the ovary and the peritoneal cavity. Gonococci very seldom extend through the uterine wall into the parametrium. Even when they do extend into the connective tissue, they are not likely to form an inflammatory mass there. Steinschneider and Schaefer injected pure cultures of gonococci into connective tissue, but no decided inflammatory action resulted. Though parametrial abscess may occasionally result from gonococci, as demonstrated by Wertheim and others, it is so rare as to be a curiosity.

The characteristic lesion, therefore, of gonorrhoea in the pelvis is pyosalpinx, with or without the complicating oophoritis and pelvic peritonitis. The great majority of all pus-tubes are due to gonorrhoeal infection, known or unknown. In 106 cases of purulent salpingitis examined by Menge the findings were as follows: sterile pus in 68, gonococci in 22, tubercle bacilli in 9, staphylococcus in 1, anaerobic bacteria in 2, and streptococci in 4. As we shall see later, the gonococcus often dies out within a comparatively short time, so it is probable that most of the sterile cases originate from the gonococcus. When this fact is taken into consideration it becomes apparent what a large proportion of the cases of purulent salpingitis are due to the gonococcus and what a small proportion to other bacteria.

In a recent article on this subject* I gave the details of a series of cases of the gonococcic class (clinical), showing the two principal diagnostic points before operation,' the interval of time from infection to operation, the bacteria found at operation, and the degree of virulence (as indicated by the result of the operation).

The cases thus tabulated in detail may be taken as typical of the hundreds of cases of this common class, which include probably five-sixths of the chronic inflammatory masses in the pelvis. These cases are so common and run such a uniform course that but few are reported in sufficient detail to show definitely the apparent cause, the interval of time from infection to operation, the location of the lesion and the bacteriological findings. It would be well if several series from the larger clinics were reported, so as to show the points mentioned, that the pre-operative diagnosis of the character of the infection and the probable virulence may be more clearly defined.

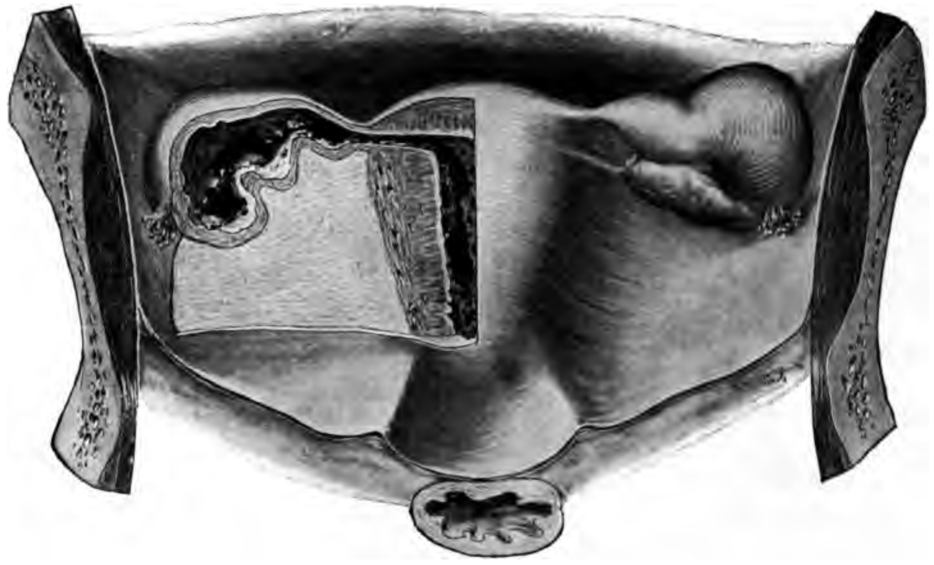

Fig. 657. Gonococcal Infection of Uterus and Resulting Lesion. Gonococcal inflammation extends along the mucosa to the tube (as indicated in left side), and causes pyosalpinx (right side).

It will be noticed in the article mentioned that in some of the cases belonging clinically to the gonococcic class, bacteriologic examination showed other bacteria instead of the gonococcus. But they are placed in this clinical class because of the apparent cause and the location of the lesion—the only decisive information usually obtainable before operation. It is only by such

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careful classification of the cases before operation and careful bacteriologic examination after operation, that a useful classification can be established and errors gradually eliminated.

The lessons to be drawn from the consideration of the cases of the gonococcic class (clinical) may be stated briefly under three heads, as follows:

Reliability of the Diagnostic Points Available before Operation. From the cases here cited, which are typical of the hundreds belonging to this class, it is evident that the two points mentioned (the apparent cause and the location of the lesion) may be depended upon to eliminate the virulent streptococcal cases. Where these two clinical signs agreed, bacteriological examination of the pus found showed either the gonococcus or absence of bacteria, with but one exception. This exceptional case was rather acute and appeared gonorrhoeal. The trouble began shortly after marriage with a purulent vaginal discharge and local irritation. The discharge was not examined bacteriologically. An adnexal mass appeared on each side and extended into the cul-de-sac. The pus pockets in the pelvis were evacuated by vaginal incision. Pus was found in the cul-de-sac and in both tubes. It was supposed to be gonorrheal. Bacteriologic examination showed pneumococci in abundance, but no gonoccoci. In the cases where the two points did not agree, there were various bacteriological findings. In uncertain cases the location of the lesion was principally depended upon for classification. Except where the trouble was clearly from puerperal sepsis, a marked tubo-ovarian mass without parametrial involvement admitted the case to this clinical class. In no instance did such a case show streptococci.

In the cases due to puerperal sepsis great care should be exercised in excluding streptococci before admitting the case to the gonococcic clinical class. The apparent location of the lesion helps, but can not be depended upon entirely in these puerperal cases. A few cases showing streptococci presented masses at first supposed to be purely adnexal. Most of these, however, on more thorough examination at the time of operation, showed that the process was located partly in the connective tissue. Streptococcal pyosalpinx without associated parametritis is certainly very rare. Miller, who reported a number of streptococcal infections and investigated bacteriologically more than a hundred cases of pelvic inflammation at Johns Hopkins Hospital, stated that he had never encountered a frank pyosalpinx due to the streptococcus. Whiteside and Walton, in a series of thirty cases of pyosalpinx examined for bacteria, found the streptococcus in three, but the question of coincident parametrial involvement does not seem to have been investigated. In a series of 106 cases of suppurative salpingitis, Menge demonstrated the streptococcus in 4, but nothing definite is said as to the parametrial involvement in these cases.

Persistence of Virulence. In the clearly gonococcic cases the bacteria were found to be absent or attenuated, as a rule within two to four months after infection. In some cases gonococci were found after several months or a year or even several years, but they had lost their virulence. Hartman and Morax state that all their specimens showing gonococci were from patients with rather recent inflammation, the duration of the trouble varying from three weeks to four months, and averaging four to five weeks.

Gonococci may die and disappear within a few weeks. In two cases detailed, where examination of the pus showed it to be sterile, the duration of the trouble was only two months in one case and five weeks in another. Gonococcic pus confined in the tube may become sterile in six or eight weeks, but it may, on the other hand, continue active for a considerably longer time. Radical operation, therefore, should ordinarily be postponed to at least three months from the onset of the trouble.

Why Wait for Sterilization or Attenuation in Gonococcal Cases. There are two reasons. In the first place, a considerable proportion of the pelvic inflammatory masses disappear without operation if nature is given a chance for three or four months. Many cases of supposed pyosalpinx so recover. The expression "supposed pyosalpinx" is used advisedly. I do not care to enter into the controversy over the possibility of the spontaneous cure of pyosalpinx, hence I limit my statement to the inflammatory masses supposed to be pyosalpinx, of which undoubtedly a considerable proportion disappear when nature is given a reasonable chance.

The second reason for waiting for automatic sterilization or effective attenuation of the pus within the quiescent mass, is that active gonorrhoeal pus is by no means harmless. General peritonitis due to the gonococcus is not so rare as formerly supposed. Hunner and Harris collected eighteen cases supported by bacteriological proof, and seven of these patients died. They found also twenty-one cases in which, though bacteriological proof was lacking, the clinical evidence indicated strongly that the peritonitis was gonococcal, and five of these patients died. Again, peritonitis is not the only danger from operation on a quiescent but still active collection of gonorrhoeal pus. Price reports a case in which such an operation caused general dissemination of the bacteria, with involvement of the joints and endocardium and finally death fifteen days after the operation. There was no evidence of peritonitis. A number of cases of general dissemination of the gonococcus have been reported. Hunner cultivated gonococci from the blood taken from the arm of a patient five days after abdominal section for supposed gonococcal peritonitis, and in a fatal puerperal case Harris and Dabney demonstrated gonococci in the valves of the heart.

Streptococcic Class (Clinical).

The distinguishing characteristics are (1) the apparent cause of the trouble and (2) the location of the lesion.

a. Apparent **cause.** Nearly all the streptococcic inflammatory masses in the pelvis can be traced to sepsis following labor or miscarriage. In the adult, streptococci do not spontaneously penetrate the non-puerperal uterus. Aside from labor or miscarriage, streptococcus infection may be due to curetment or other uterine operation, to intra-uterine application or sounding, to a stem pessary, to abnormal conditions caused by cancer or fibroid, or chronic inflammation. If a pelvic inflammatory trouble can not be traced to one of the causes above mentioned, it is almost certainly not streptococcic. In taking the history, care must be exercised not to miss an early miscarriage or an intra-uterine treatment. Care must be taken also to trace the trouble back to its very beginning, otherwise an exacerbation remote from the casual miscarriage or labor may be mistaken for the beginning of the trouble.

On the other hand, not all puerperal cases are streptococcic. About 25 per cent of puerperal infections are gonococcal. They are usually of a mild type and subside quickly, but it must be kept in mind also that other puerperal infections (staphylococcic and even streptococcic) may run a mild course. Consequently the mildness of the preceding septic attack must not be given too much weight. Outside of external evidences of gonorrhoea (about the vulva or in the discharge), most dependence is to be placed on the location of the lesion. Streptococcus lesions are usually parametrial, while gonococcus lesions are usually tubo-ovarian.

Another complicating factor in these puerperal cases is that there may be a mixed infection, causing both kinds of lesions to be present. Stone and McDonald reported such a case. This case furnished also a beautiful and striking illustration of the fact that the gonococcus spreads by way of the mucous membrane and the streptococcus by way of the connective tissue. The gonococci occupied the right tube and extended thence into the peritoneal cavity, while the streptococci occupied the right broad ligament and extended thence into the peritoneal cavity, where the two forms of bacteria met. Another possibility in these puerperal cases is that the two forms of bacteria may be mixed in one lesion—e. g., in a pyosalpinx. This is evidently very rare, but it has occurred, and the possibility of it should make us always suspicious of a post-puerperal inflammatory mass wherever located. In such a case the evidences for and against the presence of streptococci should be most carefully canvassed before deciding to subject the patient to abdominal section.

b. **Location** of the lesion. A chronic lesion in the pelvis of streptococcic origin is nearly always in the connective tissue (parametrium). Unlike the gonococcus, the streptococcus does not progress along the mucosa into the tube, but penetrates the wall of the uterus and extends into the connective tissue (Fig. 658). It not infrequently extends from the connective tissue to the peritoneum, causing peritonitis. Of course, in exceptional cases streptococci may pass from the uterus into the tube, but in such cases they are likely to pass on through the tube and cause fatal peritonitis. Consequently, in the streptococcic cases that survive the acute attack, and come later for treatment for an inflammatory mass, the lesion nearly always involves the connective tissue (parametrium). As before mentioned, Menge found the streptococcus in four cases of pyosalpinx, while Whiteside and Walton found it in three, but parametritis was not excluded. The last mentioned authors endeavored to produce streptococcus salpingitis experimentally by injecting into the uterus in rabbits pure cultures of streptococci and also mixed cultures of streptococci and staphylococci. In no instance did salpingitis result. One rabbit died of acute streptococcus septicaemia, while the others simply developed a purulent vaginitis for a few days and then recovered, and when replaced in the rabbit pen became pregnant and bore litters of six rabbits each. Miller, in the bacteriological examination of 127 cases of pelvic inflammation, found the streptococcus 7 times, but in no case was the lesion a pyosalpinx alone. There are very few exceptions to the rule that streptococcal masses in the pelvis are parametrial in whole or in part.

Are all parametrial inflammatory masses streptococcic? Nearly all. That parametrial suppuration is usually due to the streptococcus is substantiated by Rosthorn, Bumm, Doleris, and Bourges, West, Cullingworth and others. Hartman and Morax found it in 21 cases of parametrial abscess. In every such case operated on by Fritsch the streptococcus was found to be the cause. It is only occasionally that staphylococci and other bacteria are found either alone or associated with the streptococcus. As parametrial inflammation is nearly always due to the streptococcus, every case presenting a parametrial mass should be placed in the streptococcic class until it is definitely proven to be due to some other cause.

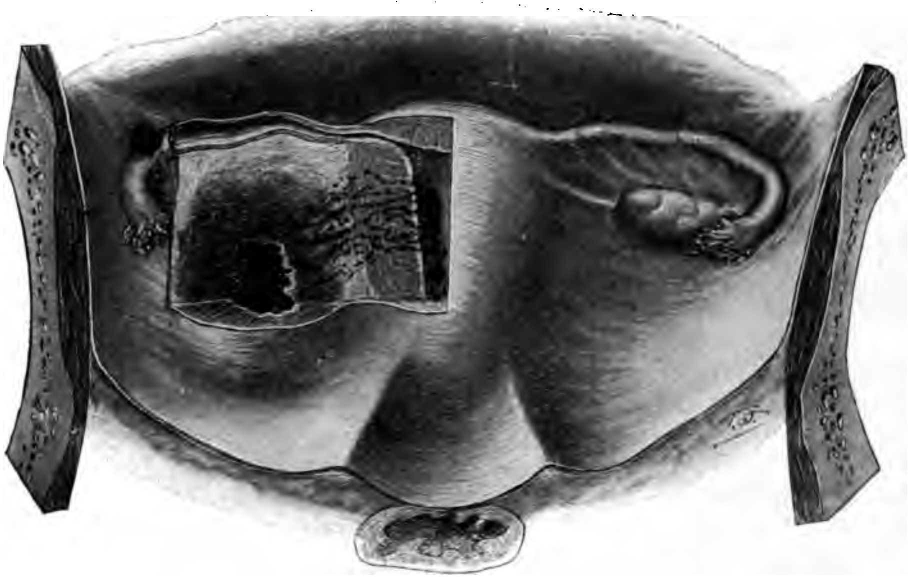

Fig. 658. Streptococcal Infection in Uterus and Resulting Lesion. Streptococcal inflammation extends through the uterine wall into the connective tissue (as indicated in left side), forming a mass in the broad ligament.

The distinguishing characteristics of a parametrial mass (chronic) are: (a) its situation in the connective area, usually in the broad ligament; (b) its low situation in relation to the uterus, often coming far down beside the cervix; (c) its intimate blending with the uterine wall, as though it were a part of the same; (d) its intimate blending with the pelvic wall, as though it were an outgrowth from that structure; and (e) its hardness, often b so hard as to simulate a cartilaginous or bony tumor growing from the pelvic wall. A tubo-ovarian mass, on the other hand, is distinguished by its being situated high in the tubo-ovarian region, or prolapsed into the cul-de-sac; by its not blending so intimately with the uterine wall, a distinct groove usually marking the point where the two come in contact; by its not blending so closely with the pelvic wall; by its presenting to the examining finger a portion of the rounded outline of the tube or ovary; and by absence of the cartilaginous hardness often seen in chronic parametrial masses.

In the article previously mentioned (page 749) I gave the details of a series of cases of the streptococcic class (clinical), showing the two principal diagnostic points before operation, the interval of time from infection to operation, the bacteria found at operation and the degree of virulence (as indicated by the result of the operation).

From this series of cases of the streptococcic class (clinical) the following facts may be adduced:

Reliability of the Two Diagnostic Points Available before Operation. When the history showed that the trouble originated from labor or abortion and the examination showed a well marked parametritis, streptococci were found in every case except one. This one exception (case 16) was Hunner's case, and he was not altogether satisfied with the bacteriologic examination, but stated that he regarded the case as streptococcal in spite of the negative findings.

When the two points do not agree, then the principal weight should be given to the location of the lesion. But not a sufficient number of carefully observed cases has accumulated to define accurately how great a dependence may be placed on the location of the lesion in these uncertain cases. This is a point to be further investigated. For the present these uncertain cases should be considered with great care in order that no streptococcic case be allowed to slip into the gonococcic (abdominal section) class.

Persistence of Virulence. The virulence of the streptococcus persists indefinitely. Miller reports one case in which the bacteria persisted for six years and another in which they persisted for twelve years. Martin states that streptococci have been found fully virulent in a pelvic inflammatory mass after nineteen years. In one instance (case 19) streptococci apparently disappeared in six months, but the pus also disappeared. The case was one of severe sepsis following labor. On the eighth day vaginal incision into a pelvic abscess evacuated pus containing streptococci. Six months later, a mass persisting, a vaginal incision was made into the cul-de-sac and the mass. No pus was found, but there was serous fluid showing staphylococci alone.

Automatic sterilization of a streptococcus abscess is perhaps possible, but it is so rare that it is not to be counted on. A streptococcal mass in the pelvis is always dangerous, and abdominal section for the same at any time is likely to be followed by a fatal peritonitis. The cases tabulated in the article mentioned give striking proof of the seriousness of intra-peritoneal operation in these cases.

Character of Operation. The only safe way to operate for streptococcal pus collections is by the extra-peritoneal method. If possible, the pus collection should be reached and evacuated per vaginam. If this can not be accomplished, it may be practicable to drain the abscess by extra-peritoneal operation above Poupart's ligament, as was done in some of the cases mentioned. Intra-peritoneal operation in these cases should be undertaken only when the patient's life is threatened by the severity of the inflammation and it is impossible to reach the mass in a less dangerous way.

Conclusions.

1. In more than half of the cases of chronic suppuration in the pelvis the pus is sterile at the time of operation, showing that sterilization of the infected focus takes place automatically within a reasonable time in the majority of cases.

2. Abdominal removal of the mass while the bacteria are active and virulent results in fatal peritonitis or localized infection in many of the cases. Abdominal removal of the mass after the bacteria are dead or greatly attenuated is almost never followed by infection, even though there is extensive escape of pus into the pelvis.

Hence abdominal operation for a chronic inflammatory mass in the pelvis should not be undertaken before the period of probable sterilization, except in those rare cases in which, in spite of palliative measures, the patient's life is threatened by the severity of the inflammation and the infected focus can not be satisfactorily drained extra-peritoneally.

3. The time required for the death of the bacteria or effective attenuation of the same varies greatly in the different cases. The persistence of virulence depends largely upon the character of the infection. The two infections concerning which definite information has accumulated as to persistence of virulence are the gonococcal and the streptococcal.

In the gonococcal cases the bacteria are dead or attenuated to practical sterility within three or four months from the beginning of the trouble. In such cases abdominal section may be safely undertaken after this period. In the streptococcus cases, on the other hand, the bacteria live and retain their virulence indefinitely. In some cases there seems to be a diminution in the virulence, but this is erratic and not to be depended upon. Abdominal section for a mass of streptococcus origin is never safe. Such an operation at any time, even years after the infection, is liable to be followed by fatal peritonitis.

4. These two classes may be distinguished before operation in most cases, the distinguishing characteristics of each being found in the **apparent cause** of the trouble and the **location of the lesion,** as already explained in detail.

5. What is the preferable time for abdominal operation for a chronic inflammatory mass in the pelvis?

a. In a case that is clearly gonococcic (agreement on the two points—the apparent cause of the trouble and the location of the lesion) abdominal operation may be considered safe after three or four months from the onset of the trouble. If after this time the mass is a source of serious irritation in spite of palliative treatment, it should as a rule be removed. On the other hand, if there is marked improvement, it is better to wait, as nature may bring about recovery without operation.

b. In a case that is clearly streptococcic (agreement on the two points) abdominal section is never safe. Even where the temperature and pulse are normal and everything quiescent, intra-peritoneal operation for the mass is liable to cause the patient's death from streptococcal peritonitis.

c. In a case that is doubtful (disagreement on the two points) a most careful study should be made of all the features of the case and every helpful diagnostic method should be brought into use to aid in reaching a positive conclusion. No intra-peritoneal operation should be undertaken until the streptococcus is excluded with reasonable certainty. In a doubtful case in which the abdomen is opened on the supposition that the mass is tubo-ovarian and it is found before adhesions are much disturbed that the mass is principally in the connective tissue (parametritic), the route of attack should be changed to extra-peritoneal (per vagina or above Poupart's ligament) and the abdominal wound closed. Such a lesion probably contains streptococci and the adhesions of omentum and bowel, which causes the deceptive mass high in the tubal region, constitute nature's barrier between the virulent bacteria and the peritoneal cavity. When this barrier is broken down, the way is opened for a fatal peritonitis.

6. There are three reasons for calling special attention to this subject: a. A matter of such vital importance should, I think, be given more prominence in text-books and in instruction to students, and in society proceedings and discussions concerning pus collections in the pelvis. b. Lives are still being sacrificed by operators who seem unaware of the great danger of abdominal operation for inflammatory masses following puerperal sepsis. c. Further investigation (with careful recording in large series of cases of the apparent cause of the trouble, the location of the lesion, the interval of time from infection to operation, the bacteriologic findings, and the result of operation) is required, that the definite classification of the cases before operation, as above indicated, may be firmly established and errors eliminated.

3. Avoid radical operation in those cases in which the examination shows only a somewhat thickened and tender tube (catarrhal salpingitis), or a slightly enlarged and sensitive and perhaps prolapsed ovary (cystic ovary), or adhesions with some induration and fixation, but with no distinct mass. Give a thorough trial to the non-operative measures previously mentioned, with such additions and modifications as the peculiarities of the case may suggest. In those cases in which all signs of active inflammation have subsided, leaving only adhesions binding the uterus or ovary in abnormal position or distorting the tube, much benefit may sometimes be derived from pelvic massage, with stretching of adhesions, or from pressure treatment, or from the two in combination. In cases with troublesome uterine discharge and excessive menstrual flow or painful menstruation, thorough dilatation and curettage is advisable. This tends to diminish the discharge and menstrual suffering, and in some cases it has a decided beneficial effect on the adjacent adnexal trouble. Furthermore, it gives a chance for a thorough examination under anesthesia, by which the exact condition of the ovaries, tubes and uterus can be more accurately determined. In cases with persistent pain without decided palpable lesion—i. e., those cases in which the nervous element is marked and in which the affection approaches the character of a neuralgia or neuritis—electricity may give some relief (see page 353). It is in these cases also that a tonic regimen (with general massage, brush rubs, salt rubs, etc.) and antineuralgic remedies are especially indicated, and often produce a cure with little or no local treatment.

Careful study should be made of the patient generally—of all the organs. In some such cases it will be found that the principal trouble is some general disease or some local disease in another portion of the body, the pelvic disorder being of secondary importance. If nothing is found outside the pelvis to account for the patient's symptoms and all other measures fail to relieve the pelvic distress, open the abdomen and ascertain the exact condition of the pelvic organs and vermiform appendix and then correct, as far as possible, the pathological conditions found.

4. In the operative cases, when the patient is under forty years of age and the pathological condition will permit, **preserve** enough **ovarian tissue** to continue menstruation and enough Fallopian tube to make pregnancy possible.

In those cases where all active inflammation has disappeared, leaving only adhesions and exudate, it is often possible to preserve in place part of an ovary and part of a tube, which by proper treatment may continue their functions.

This conservative work is a comparatively recent development of pelvic surgery, but several cases of pregnancy have already been reported from such remnants of ovary and tube preserved. Even if pregnancy does not take place, the simple fact that it may take place—that it is possible—leaves the patient in a much better frame of mind.

If the uterus must be removed, one ovary at least should be preserved, if it is not diseased, because the preservation of any ovary, or even part of an ovary, tends to prevent those troublesome nervous symptoms which frequently accompany the artificial menopause and which sometimes become serious.

PROGNOSIS.

What are the ultimate results in cases of chronic pelvic inflammation? What answer shall be given to the patient who asks, "Doctor, will the proposed treatment make me a well woman?"

Now, the results differ much in various cases, and in order to answer this question in a comprehensive way it is necessary to divide the cases into two great classes—the first including those cases in which the symptoms are apparently all dependent on an evident lesion, and the second including those cases in which there are symptoms the cause of which is not clear.

1. Where there is a marked lesion in the pelvis of such nature as to account for all the symptoms and the patient is otherwise in good health, proper treatment will in all probability effect a cure. The treatment must, of course, be carried out carefully and vigorously according to the indications in the particular case. And in any case it will extend over several months, for even in the cases in which the pelvic legion can be largely removed by operation the patient will require careful after-treatment to put her in good health.

As to the promises you make to the patient, be careful. You must give the patient all the encouragement possible, for encouragement helps in the cure, but you must not commit yourself in such a way that, if something unforeseen prevents a cure, you will be in the position of having promised something that you can not give. This subject of prognosis and promises to patients is one of the most trying in medical and surgical work. Most diseases may, by treatment, be either cured or improved so much that the patient thinks them cured. Advertising quacks take advantage of this fact and promise certain cure in all cases—"Cure guaranteed." Some of the patients are, no doubt, really cured, and others are so much improved for the time being that they think themselves cured and shout accordingly, while those who are not improved are so ashamed of having gone to a quack that they say nothing about it, and so the imposter goes on without hindrance. But the reputable physician must be careful with his promises. We deal in facts, not deceptions. Our duty is to employ the best possible means for the relief of the patient and the cure of her disease, and at the same time to give her all the encouragement possible. There are, however, so many uncertainties that enter into the problem that it is, in most cases, best to say but little about the prognosis unless the patient asks directly concerning it. If the patient requests a definite statement as to just what chance she has of permanent relief, promise her all that the circumstances will warrant—giving the most favorable construction to all phases—but always with this proviso, said to the patient herself or to a near relative, that in spite of the best treatment there is a possibility of the development of conditions which would give a different result. This caution in promises is particularly important in surgical work, for many patients are prone to expect from an operation the cure of every existing disturbance, whether it comes within the scope of the operation or not.

2. In cases where there is no marked pelvic lesion, or where, in addition to a marked lesion, there are symptoms that are not accounted for by the pelvic disease, the prognosis is uncertain. The fact that there are symptoms without apparent cause means that there is a hidden factor in the case, and that hidden factor may continue to cause much trouble after the obvious lesion is removed. Promise as much as you can count on safely, but no more. Sometimes very serious or troublesome symptoms will subside after correction of an apparently slight pelvic disorder. Many symptoms, particularly nervous symptoms, apparently not closely connected with the pelvic disease, disappear on

the cure of the pelvic disorder, much to the delight of the patient and of the physician. On the other hand, many symptoms, particularly nervous symptoms, apparently due to well marked pelvic disease, persist after the removal of the disease, much to the disappointment of the patient and the physician. In some of these cases the troublesome symptoms had no connection with the pelvic trouble, but were caused by some entirely separate disorder. In other cases the nervous symptoms were really caused by the pelvic disease, but through long continuance of the irritation there was produced in the nervous system a pathological condition capable of persisting long after the removal of the causative lesion.

Then, again, there are certain cases of hereditary tendency to insanity in which a serious pelvic disease is sufficient to cause a breakdown and the development of mental disorder. In such a case, though you may hope for improvement, you can not promise much, for the mental disorder, once excited, may persist in spite of the removal of the exciting cause.

Again, occasionally a patient with this tendency to mental disturbance will get along very well until subjected to operation for some disease, pelvic or otherwise, and then the added strain of the operation upsets the mental balance and she becomes insane.

These are, of course, exceptional circumstances. I mention them simply to show how many things the physician must think of—what a broad view of the subject he must take—in giving a prognosis as to the ultimate result.

CHAPTER XI.

OTHER AFFECTIONS

of Fallopian Tubes, Pelvic Peritoneum and Pelvic Connective Tissue.

PELVIC TUBERCULOSIS.

Pelvic tuberculosis is tuberculosis of the Fallopian tubes or pelvic peritoneum or ovaries, or of all these structures together. It is known also as "tubercular salpingitis," "tubercular pelvic peritonitis" and "tubercular oophoritis."

ETIOLOGY.

The same factors are operative here as in tubercular lesions elsewhere—namely, tubercle bacilli and lowered tissue resistance. As to how the tubercle bacilli reach these deep-seated structures, and why they locate here, is an interesting story and one not yet completed.

The following factors have a bearing on the etiology of the affection:

1. Tubercular lesions in distant organs—for instance, in the lungs. From these distant lesions the bacilli get into the blood stream and are carried to various parts of the body, frequently to the Fallopian tubes. In some cases the Fallopian tube lesions constitute the only secondary lesion found.

2. Tubercular lesions in adjacent organs, as the bladder, rectum, intestines or abdominal peritoneum. The most frequent are tubercular appendicitis and tubercular ulceration of the small intestine. In the former the process extends directly along the peritoneal surface to the pelvic peritoneum and the Fallopian tubes and the ovaries. In the latter there may be an adhesion between the irritated peritoneal surface over a tubercular ulcer of the intestine and the surface of a tube or ovary, or of the pelvic peritoneum. After adhesion the process gradually extends through the intervening tissue.

In tuberculosis of the bladder or rectum, penetration of intervening tissue may take place, thus bringing the bacilli in contact with the structures under consideration.

3. Occasionally the tubercular infection may come by way of the genital tract from lesions lower—for example, from tuberculosis of the uterus, or of the vagina, or of the vulva. This, however, is very rare, the process usually extending from above downward instead of from below upward.

PATHOLOGY.

The cases of pelvic tuberculosis may be grouped roughly into two classes—(A) those in which the peritoneum is principally involved and (B) those in which the process is located principally in one or both Fallopian tubes.

(A.) Peritoneal Tuberculosis.

Peritoneal tuberculosis begins as a deposit of fine tubercles in the pelvic peritoneum. This deposit may take place slowly or rapidly. If it takes place slowly, the disturbance may be slight and the symptoms hardly noticeable. If the deposit takes place rapidly, it produces the condition known as acute miliary tuberculosis of the pelvic peritoneum. In this marked miliary form the whole pelvic peritoneum covering the various structures may be closely studded with the tubercles (Fig. 659).

This produces pelvic peritonitis. The peritoneum about the deposits is injected, reddened and lacks its normal luster. Ascitic fluid appears and the fluid may have a bloody tinge. The fluid may be free in the peritoneal cavity, with no limiting adhesion, or there may be adhesions that form pockets in which the fluid is confined (encysted fluid). In this form the tubercular process is usually widespread, involving a large part of the general peritoneum. The intestinal coils may be adherent to each other or to the parietal peritoneum, or to all the pelvic structures. The adhesions are usually frail and bleed easily upon being separated, but the bleeding soon stops. On account of the tendency to peritoneal effusion in this miliary form of tuberculosis, the adhesions are not usually extensive.

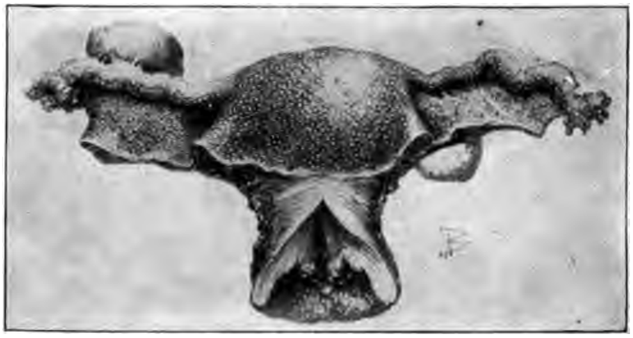

Fig. 659. Pelvic Tuberculosis—Peritoneal Form. (Kelly—*Operative Gynecology*.)

After development to this stage the tubercles may pursue either of two courses.

a. The tubercles may undergo fibroid change. The active symptoms disappear, the fluid is absorbed, and the diseased areas become scar tissue. This is called "fibroid tuberculosis." It is a limitation of the tubercular process and constitutes a temporary cure of the disease.

b. Instead of the tubercles passing into this quiescent condition, they may spread and coalesce and break down, and thus the process becomes progressively destructive. The tubercular areas undergo necrosis and caseation, dense adhesions take place, collections of tubercular pus form, and all the pelvic structures become bound together into an irregular mass, with broken-down tubercular lesions scattered throughout.

(B.) Tubal Tuberculosis.

In tuberculosis of the Fallopian tubes the process, instead of appearing first in the peritoneum, may start in the interior of a tube.

In this situation three forms are recognized—(a) miliary tuberculosis, (b) chronic fibroid tuberculosis and (c) chronic diffuse tuberculosis.

a. Miliary tuberculosis of a Fallopian tube presents the same characteristics as miliary tuberculosis of other mucous membranes—that is, there are fine tubercles scattered beneath the epithelium and not yet broken down. Owing to the structure of the tube, the miliary tubercles readily escape observation unless the removed tube is examined miscroscopically. This form of tuberculosis may give rise to but few symptoms, and may cause so little disturbance that there is no suspicion of serious disease.

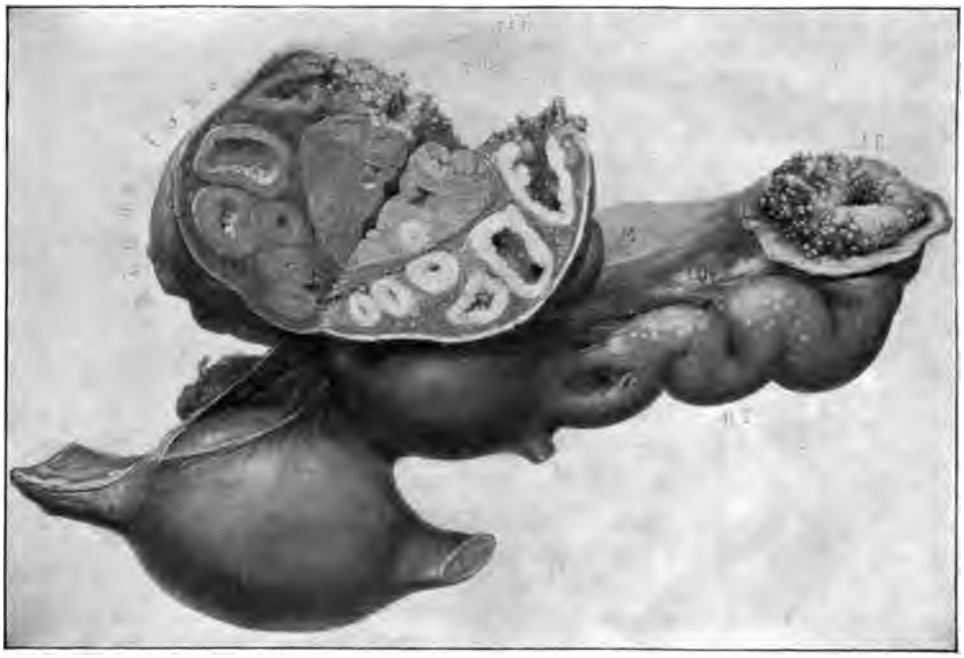

Fig. 660. Pelvic Tuberculosis—Tubal Form. (Kelly—*Operative Gynecology*.)

b. If these tubercles fail to pass on to the stage of caseation, but instead become surrounded by a large amount of connective tissue and pass into a quiescent state, we have the condition known as "fibroid tuberculosis of the tube." The tube is somewhat thickened, and hardened and enlarged by the infiltration, but there is little or no breaking down of the lesions.

c. If, on the other hand, the tubercles progress to the stage of caseation and break down, there results the condition known as "chronic diffuse tuberculosis of the tubes." The tube is disorganized and contains a collection of caseous tubercular material (Fig. 660).

The appearance of the tube varies of course with the severity of the disease. In advanced cases the tube is greatly enlarged and on cutting it open the yellow broken down material is seen—the so-called "caseous pus." This varies much in consistency, being in some cases rather thin and in other semi-solid. When this is removed, the mucosa of the tube is seen to be studded with tubercles in all stages of breaking down, and there are also irregular, ragged ulcers, with small yellowish tubercles in their walls.

When the peritoneal surface of the tube also is involved, it is studded with small tubercles and is usually adherent to some of the surrounding organs. Occasionally the tubercular areas undergo calcification.

Tubal tuberculosis is also one of the common causes of general tuberculous peritonitis, a point of importance which will be further considered under treatment.

Pelvic tuberculosis has been found to be present in from six to eight per cent. of the cases of abdominal section for pelvic inflammation, but in only about a quarter of these is it so marked as to be easily recognized. In the remaining cases it is recognized only by microscopical examination of sections of the tube.

No period of life is exempt from genital tuberculosis. It has been found at all ages, from the infant of a few months to the aged woman past eighty. But the period of life in which it occurs most frequently is from the age of 20 to that of 40 years—i. e., during the period of greatest sexual activity.

SYMPTOMS AND DIAGNOSIS.

The symptoms of pelvic tuberculosis are much the same as those of chronic pelvic inflammation. In fact it is a pelvic inflammation of a special kind. In a large per cent. of the cases the diagnosis of tuberculosis is made only after the abdomen has been opened, the operation having been undertaken for what was supposed to be ordinary pelvic inflammation.

In not a few cases, however, a positive diagnosis of tuberculosis is possible before operation, and in some cases it is easy.

The conditions that point to pelvic tuberculosis are as follows:

1. Symptoms of chronic pelvic inflammation in a girl or young woman who has had no evidence of uterine infection.
2. Gradual onset without previous uterine disease, and persistent progress without the periods of marked improvement usually present in ordinary pelvic inflammation.
3. Emaciation, gradual and persistent, without a corresponding severity of the inflammatory trouble.
4. Evidences of tuberculosis elsewhere. Most cases of pelvic tuberculosis occur in patients having pulmonary or intestinal tuberculosis.
5. Tuberculin reaction. In a doubtful case this may aid materially in the diagnosis. The injection method or the cutaneous test may be employed. The ophthalmic test is dangerous to the eye and had best be avoided.

TREATMENT.

If there are no contra-indicating lesions elsewhere, the affected tubes should be extirpated, preferably by abdominal section. The operation should be preceded and followed by antitubercular remedies and regimen.

If there are marked lesions elsewhere, or if the local trouble has advanced too far for radical operation, employ palliative measures. The palliative measures include the administration of antitubercular remedies internally, the drainage of fluid collections by operation and other measures mentioned under chronic pelvic inflammation.

In some cases of extensive peritoneal tuberculosis, an apparent cure has followed simple abdominal section. It is still a question why such a change for the better should sometimes follow the mere opening of the abdomen in these cases, but the fact that such results are secured has been demonstrated many times, and patients that are in suitable condition should be given this chance for improvement. The affected tubes, however, should always be removed when possible.

Pelvic tuberculosis often eventuates in general peritoneal tuberculosis. General tubercular peritonitis can usually be traced to a tubercular appendicitis, or to tubercular salpingitis, or to tubercular ulceration of the intestine. In operating for tubercular peritonitis it is important to find and remove the focus if it can be done without too much traumatism. Mayo has done great service in insisting on this and in demonstrating the marked increase in the percentage of cures resulting therefrom.

EXTRA-UTERINE PREGNANCY.

Extra-uterine pregnancy is pregnancy outside of the uterine cavity. With few exceptions the developing embryo is, in the beginning, located in the Fallopian tube, consequently the term "tubal pregnancy" is applicable in most cases. The developing ovum may lodge at any part of the tube (see Fig. 661).

ETIOLOGY.

The cause of extra-uterine pregnancy is some interference with the downward progress of the fertilized ovum. The ovum and spermatozoa meet normally in the tube, and after fertilization the ovum passes along the remainder of the tube and into the uterus, where it becomes attached and develops, constituting a normal pregnancy. Now, if the progress of the fertilized ovum is interfered with so that it remains in the tube and develops there, extra-uterine pregnancy is the result. This interference with the downward progress of the ovum is usually due to some obstruction in the narrow proximal portion of the tube, though the obstruction may be situated anywhere between the ovary and the uterine cavity. The tubal obstruction must, of course, not be so marked as to prevent the upward progress of the spermatozoa; consequently extra-uterine pregnancy is impossible when both tubes are completely occluded by inflammation or other process.

The conditions which interfere more or less with the downward progress of the ovum are as follows:

1. Mild salpingitis. Slight inflammation may lead to destruction of the cilia. The action of the cilia is supposed to be necessary to the normal progress of the ovum from the abdominal to the uterine end of the tube, the peristaltic action of the tube being of secondary importance and not sufficient in itself to carry the ovum along.

Again, such inflammation leads to swelling of the tubal mucosa and mechanical obstruction in the narrow portion of the tube. This obstruction, while not marked enough to prevent the upward progress of the active spermatozoa, may prevent the downward progress of the passive ovum.

2. Adhesions, from inflammation originating in the tube or elsewhere, may so distort the tube by bending or pressure as to partially obstruct its lumen.

3. Tumors within the tube wall or arising from other structures may by pressure narrow the lumen of the tube.

4. Malformations. Abel agrees with Freund that some of the spiral twists which are normally present in the tube in the embryo may persist to adult life and cause sufficient obstruction to lead to extra-uterine pregnancy. Diverticula may lead off from the lumen of the Fallopian tube. If a fertilized ovum lodges in one of these blind canals, tubal pregnancy will result. There may be also accessory tubes. These are usually connected to the normal tube, but sometimes by a cord only without any lumen. In such a case, if a fertilized ovum enters this accessory tube, it will remain there.

A rudimentary tube which is not open all the way to the uterus may be entered by an ovum which has been fertilized by a spermatozoa entering from the normal tube of the opposite side. The fertilized ovum is, of course, stopped at the impervious portion of the deformed tube, and a tubal pregnancy is the result. Kelly figures an interesting case in which this same series of events occurred in a rudimentary uterine horn, the horn being so separated from the remainder of the uterus that it resembled part of the tube (Fig. 409).

PATHOLOGY.

The fertilized ovum may lodge at any part of the Fallopian tube, as shown in Fig. 661. When the ovum becomes attached to the tube wall, certain changes begin. First, there is marked hyperemia, which leads to some swelling of the structures and to increased growth of all the tissue elements of the tube wall. In the mucosa in tubal pregnancy the stroma cells enlarge and become decidua cells, though they do not become so large or so closely packed together as in the uterine mucosa. There is some hypertrophy of the muscular tissue near the attachment of the ovum. Very soon there appear certain interesting changes that have a bearing on the early rupture of the pregnant tube. As the fetal elements reach into the tubal tissues, seeking nourishment, the wall of the tube becomes penetrated by wandering cells called "trophoblasts." These trophoblast cells work into the muscular layer of the tube and weaken it, and gradually penetrate all the way through the wall. This growth of fetal elements into and through the wall of the tube causes early rupture of the tube and serious internal hemorrhage.

Pathologically and, in a measure, clinically, the causes may be divided into the following classes:

1. **Before Rupture.** The developing embryo with its membranes is still completely surrounded by the unbroken tube.

2. **Intraperitoneal Rupture with Single Moderate Hemorrhage.** The blood gravitates into the cul-de-sac of Douglas. Adhesions bind together the structures above, thus forming a roof which shuts off the blood-filled cul-de-sac from the remaining part of the peritoneal cavity. This condition is known as "pelvic hematocele" (Fig. 662). The blood may be gradually absorbed without further disturbance or the hematocele may require drainage, as described under treatment. The very early embryo with membranes, having been completely cast off from its point of nourishment, perishes and is usually absorbed without causing further trouble.

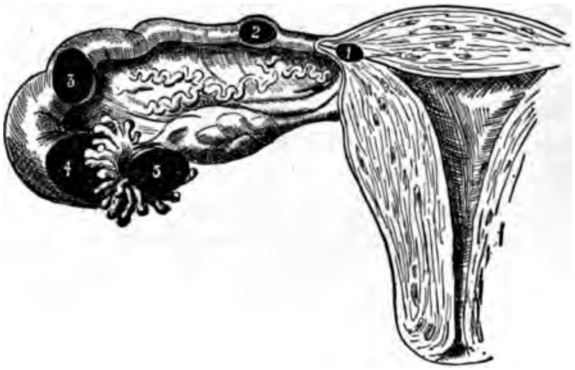

Fig. 661. Diagram Representing the Sites for the Various Forms of Tubal Pregnancy. 1, Interstitial pregnancy. 2, Isthmial pregnancy. 3, Ampullar pregnancy. 4, Infundibular pregnancy. 5, Tubo-ovarian pregnancy. (Gilliam—*Practical Gynecology*.)

3. **Intraperitoneal Rupture with Repeated Moderate Hemorrhage.** The membranes usually remain partially attached within the broken tube, and hence the extruded embryo continues to grow, causing trouble later. The first hemorrhage leads to peritoneal exudate, with resulting adhesions, which bind together adjacent structures. Thus the blood mass and broken tube and growing embryo are surrounded by a wall of exudate and adherent intestine. This wall lessens the danger temporarily. But after a few days or a few weeks the continued growth causes further rupture of the tube or of the other limiting tissues, with accompanying fresh intraperitoneal hemorrhage of small or large amount. More exudate is then thrown out about the new blood mass, lessening the danger for a time. This process may be repeated

many times within the course of a few months, provided the patient does not in the meantime succumb to hemorrhage or peritonitis. Thus there is found in this class of cases a gradually increasing mass (Fig. 663), accompanied by frequent attacks of pelvic pain and marked soreness. This class includes the majority of cases of extrauterine pregnancy that come to operation. Whether or not the patient's color and pulse are much affected depends upon the severity of the hemorrhages. In many cases the recurring pain and soreness are the most evident features, and at the bedside such cases are often mistaken for ordinary pelvic inflammation.

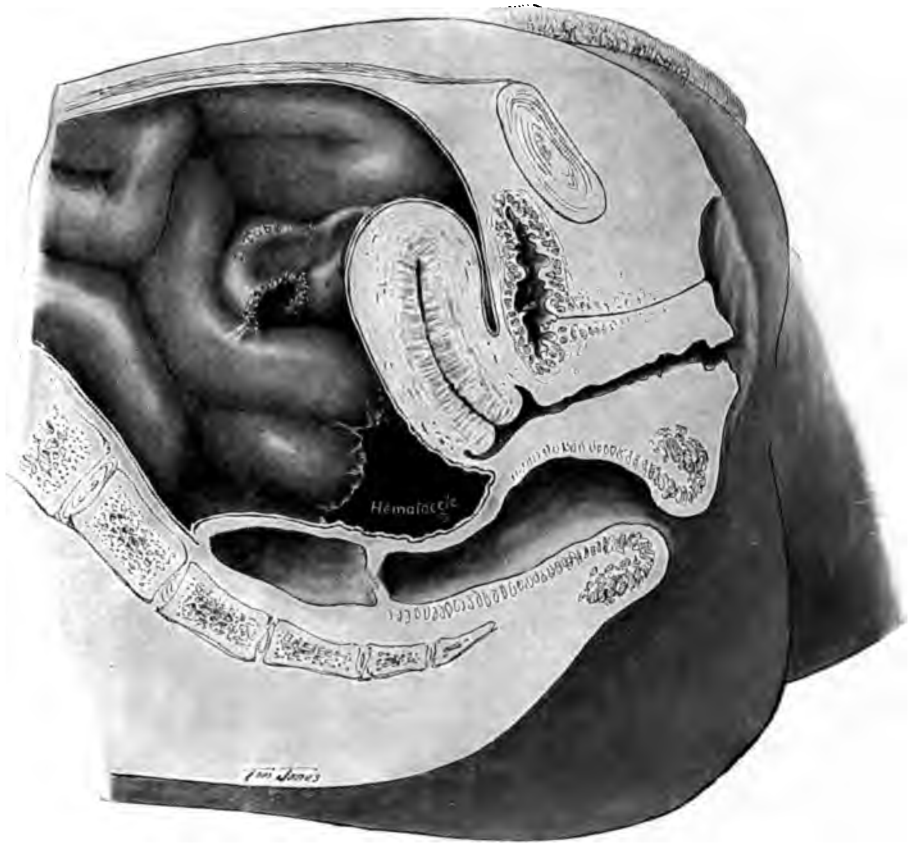

Fig. 662. Pelvic Hematocele. Indicating the condition where there has been a tubal abortion and the blood from it has gravitated to the cul-de-sac and become surrounded by exudate.

4. Intraperitoneal Rupture with Profuse Hemorrhage. There is a free rupture of the tube (Fig. 664), and blood pours out into the peritoneal cavity rapidly and in great quantity. It extends among the intestines and in some cases practically fills the abdominal cavity, as indicated in Fig. 665. The patient at once passes into a condition of severe shock. She is blanched, almost pulseless and, with the air-hunger and extreme pain, presents a most distressing picture. The cases of this class have been fittingly designated as the "tragic" cases. This severe and persistent hemorrhage is most likely to occur when the developing ovum is situated near the uterus, in that portion of the tube known as the "isthmus." In the vast majority of cases the bleeding ceases when the patient passes into complete shock, which is nature's provision for checking the hemorrhage. In exceptional cases, however, the patient does actually bleed to death, either from the first free flow or from a renewal of the bleeding due to vomiting, bowel movement, sitting up or other disturbance of the newly formed clot.

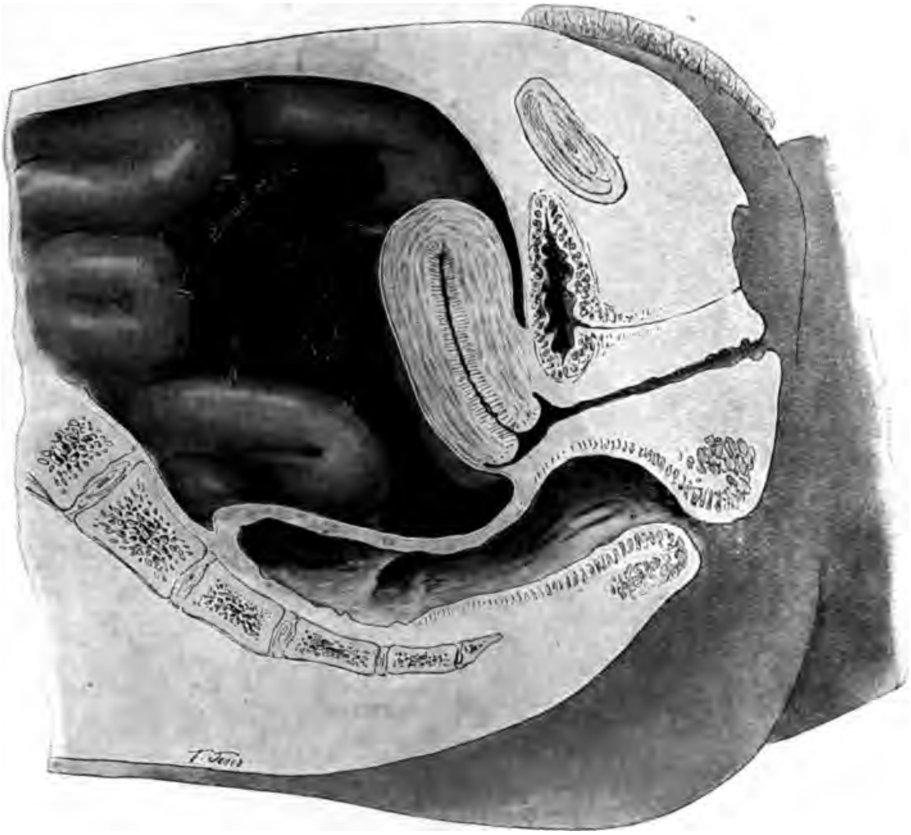

Fig. 663. Blood Mass about Tube. Indicating the condition where there has been rupture of the tube, with repeated slight hemorrhages, resulting in a large mass of blood and exudate, which surrounds the tube.

5. Tubal Abortion. If the place of lodgment of the fertilized ovum happens to be near the outer end of the tube (Fig. 661), the resulting enlargement of the lumen of the tube by the developing embryo opens the ends of the tube, and the embryo with its membranes is likely to be extruded from the end of the tube into the peritoneal cavity. This is called "tubal abortion" (Figs. 666, 667). Tubal abortion is accompanied with more or less intraperitoneal bleeding and gives rise to practically the same symptoms as tubal rupture, except not usually so severe. A considerable proportion of cases of supposed tubal rupture are really cases of tubal abortion, particularly those resulting in pelvic hematocele or a slight mass higher about the tube.

6. Rupture Into Broad-Ligament. When the break in the tube wall takes

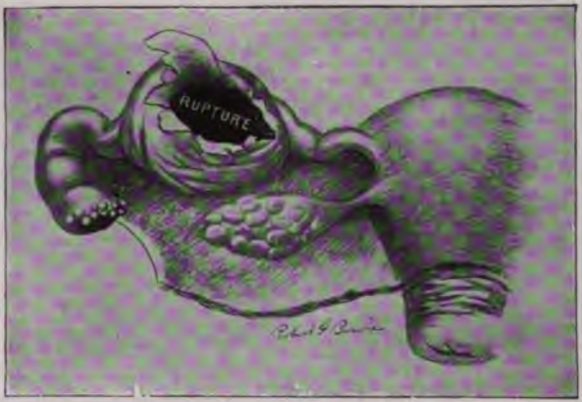

Fig. 664. Tubal Pregnancy, with Rupture into the Peritoneal Cavity. (Gilliam—*Practical Gynecology.*)

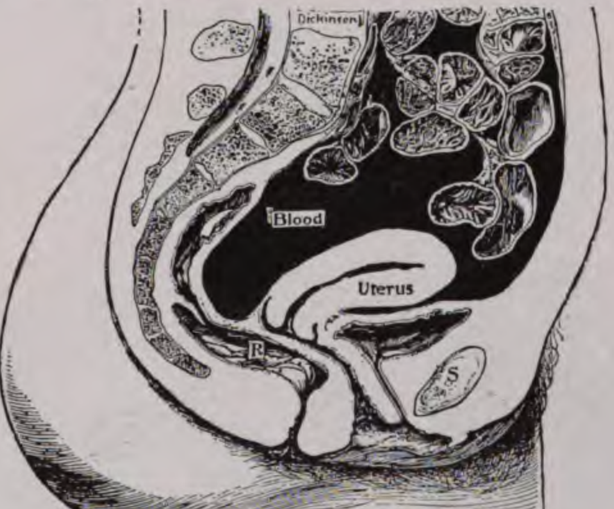

Fig. 665. Tubal Pregnancy with Intra-peritoneal Rupture, showing the blood in the peritoneal cavit,y among the intestinal coils. (Dickinson—*American Text-book of Obstetrics.*)

place between the layers of the broad-ligament, the hemorrhage is into the connective tissue of the pelvis—forming a "hematoma," as shown in Fig. 668. The hemorrhage may be moderate, forming a hematoma in one broad-ligament, or it may be severe, forming a hematoma which gradually extends until it fills most of the connective tissue space in one or both sides of the pelvis. If the extruded embryo continues to grow in the broad-ligament, then arises the condition designated as "broad-ligament pregnancy."

7. Interstitial Pregnancy. When the ovum lodges and develops in the interstitial portion of the tube (Fig. 661), the resulting condition is known as "interstitial pregnancy." This is peculiar in that the development takes place within the wall of the uterus, though outside the uterine cavity (see

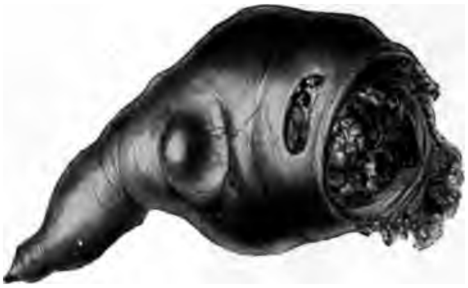

Fig. 666. Tubal Pregnancy, with abortion through the abdominal end of the tube into the peritoneal cavity. The end of the tube is dilated, but the structures have not yet been extruded. (Kelly—*Operative Gynecology*.)

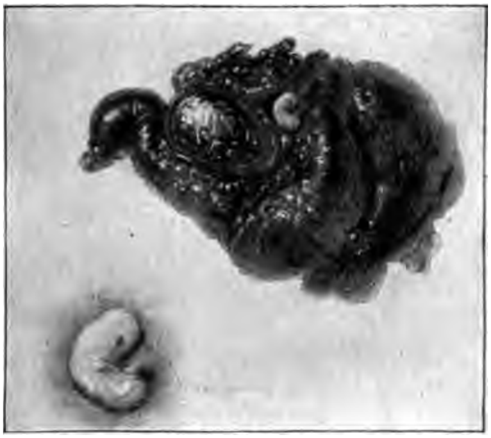

Fig. 667. The Clots, Membranes and Embryo extruded into the peritoneal cavity in the case of Tubal Abortion shown in Fig. 666. (Kelly—*Operative Gynecology*.)

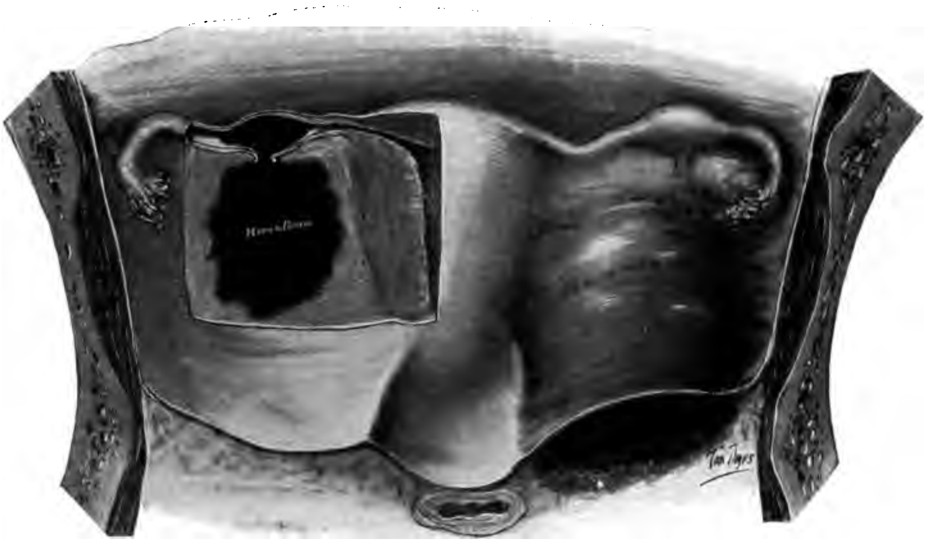

Fig. 668. Hematoma. In the left broad ligament is indicated a small hematoma from rupture of the tube In the right broad ligament is indicated a much larger hematoma.

Fig. 371). In this form of tubal pregnancy, rupture of the gestation sac usually does not take place until much later than with the ordinary form. Also, the rupture may in some cases be into the uterine cavity. Consequently there is a possibility of this form of tubal pregnancy terminating as a normal (intra-uterine) pregnancy. Interstitial pregnancy in the early stages approaches in symptoms and signs very close to normal pregnancy, and hence presents more difficulties in diagnosis than a pregnancy farther out in the tube. It is difficult and sometimes impossible before operation to distinguish between interstitial pregnancy and pregnancy in a rudimentary horn of the uterus (cornual pregnancy). The latter is an intra-uterine pregnancy in an abnormally shaped uterus and does not belong to the affection now under consideration (extra-uterine pregnancy), though it may require the same operative treatment, as, for example, in the case shown in Fig. 409.

Fig. 669. Mother and Child in a case of Extrauterine Pregnancy, operated on at full term. (Cragin—*American Gynecological and Obstetrical Journal.*)

8. Ovarian Pregnancy. If the developing ovum is found within the ovary, it constitutes "ovarian pregnancy," of which a few well-substantiated cases have been reported.

9. Wandering Pregnancy. If the pregnancy is found in the peritoneal cavity without any apparent connection with the tubes, or uterus, or ovary, it is called a "wandering pregnancy," after the manner of designating fibroids which have lost their connection with the uterus. Such a pregnant mass (fetus and surrounding membranes) may be attached to and receive blood supply from various structures. In an interesting case reported by Tuholske the placenta was attached to the liver, creating a most serious condition. "Abdominal pregnancy" is a general term which has been used to designate cases of pregnancy developing in the peritoneal cavity, with or without connection with the tube or ovary.

10. Extrauterine Pregnancy Carried to Near Term. The fetus may develop to term or nearly so. The embryo and membranes remain attached to the tube and derive nourishment there, and the fetus develops in the peritoneal cavity almost the same as in the uterus. Again, the embryo and membranes may be extruded entirely from the tube and find attachment to some adjacent structure, from which nourishment is derived, or to some distant structure—for example, the liver, as in the case above mentioned. Tuholske reported a most interesting case in which the placenta was attached to the liver. In this class of cases, if the patient survives long enough and the fetus continues to grow to term, false labor pains come on and the child dies, and it then constitutes a foreign body in the abdomen (Fig. 422). This may lead to peritonitis and death of the mother, or the dead child may become somewhat encapsulated and remain for months or years, constituting a "lithopedion" (Figs. 423 and 424 show such a case). In rare instances of extra-uterine pregnancy carried to near term the child has been saved alive by operation. Fig. 669 shows the child and the mother in one such case.

SYMPTOMS AND DIAGNOSIS.

Before Rupture. The first rupture of the tube with slight bleeding takes place within a few weeks after the lodgment of the fertilized ovum. Previous to this primary rupture the symptoms are practically those of an early pregnancy. The patient goes over her menstrual time without the menstrual flow appearing. There is some nausea, usually most marked in the morning, and perhaps some tenderness of the breasts. Pain is not necessarily present. There may be some soreness in the pelvis, either general or localized to one side, but this is rarely troublesome enough to arouse suspicion of anything abnormal, for some soreness through the pelvis is very common in normal pregnancy owing to the marked congestion and the enlarging uterus.

Pelvic examination at this stage shows some tenderness about the adnexa of one side, and perhaps a small mass, due to the enlargement in the tube. However, the normal ovaries are usually tender, especially when congested, as in early pregnancy, and the tenderness is frequently more marked on one side. The small mass in the tubal region is really the only positive evidence of any abnormal condition within the pelvis, and as far as known this mass may have been there for a long time, due to some previous trouble. Unless a previous examination has shown the pelvis to be clear, making it certain that the little mass is of recent development, the diagnosis of tubal pregnancy is hardly justified, for there is not sufficient evidence to establish it. A diagnosis based upon such insufficient evidence will prove erroneous in the great majority of cases, as has been amply demonstrated by the operative results from such hasty diagnoses. In exceptional cases the soreness will be so well localized to one side and so marked, particularly on exertion, and the tenderness of the little mass so very pronounced on palpation, in a patient previously perfectly well, that a diagnosis of tubal pregnancy with operation for the same before rupture may be safely made. But such cases are very rare, the conditions so closely simulating normal pregnancy that no suspicion of abnormality is aroused, or, if aroused, the examination signs are not positive. I am satisfied that a large proportion of the cases set forth as diagnosed and operated on "before rupture" are really not seen until after the primary rupture. There may not be much disturbance from this first rupture, only a very slight hemorrhage taking place. But this is sufficient to give the few sharp pains, and the persistent soreness, and the markedly tender mass without apparent cause—the three symptoms that occupy such an important place in the diagnosis of tubal pregnancy after rupture.

Be careful (1) to make a pelvic examination in every case of early pregnancy in which there is sufficient pain or soreness in the pelvis to arouse suspicion of some abnormality, (2) to make no positive diagnosis of tubal pregnancy unless the physical signs justify it, and (3) to pronounce no case "before rupture" which shows blood in the pelvis, or recent plastic exudate and adhesions about the tube, or damage to the peritoneal coat of the tube at the time of operation.

Rupture with Repeated Moderate Hemorrhages. In the majority of cases tubal pregnancy after the primary rupture presents the symptoms and signs of ordinary acute or subacute pelvic inflammation (salpingitis), but with certain peculiarities.

Suppose that you are called to see a patient with pain in the pelvis and lower abdomen, and a tender mass beside the uterus or behind it. Is the trouble ordinary pelvic inflammation or is it tubal pregnancy with resulting inflammation?

As ordinary pelvic inflammation, in the form of salpingitis, is the more common affection, it is to be assumed that the trouble is ordinary pelvic inflammation and not tubal pregnancy, unless there are special symptoms pointing to the latter. The **special symptoms** pointing to tubal pregnancy (but not pathognomonic of it) are as follows:

1. **A Missed Menstruation.** The patient, previously regular in her menstruation, fails to come unwell at the proper time. She goes overtime a few days or a week, or several weeks.

2. **Sudden Onset of Pain.** After going overtime for a few days or a few weeks, the patient is suddenly seized with pain in the pelvis, usually severe enough to confine her to bed, and in exceptional cases she is completely prostrated and in collapse.

3. **Bloody Vaginal Discharge.** Usually within a few days of the onset of the pain a blood-stained vaginal discharge appears. The patient regards this as the return of the menstrual flow. But generally it is not so free as the regular menstrual flow, and does not stop in a few days as the menstrual flow should, but persists as an irregular bloody discharge for a week or two—some days present and other days absent. In some cases there are shreds of membrane and blood-clots in the discharge, leading to the supposition that a miscarriage has taken place.

4. **Only Slight Fever.** The temperature may go up to 102° or even higher

at the onset of the trouble, but after that it usually ranges about 100° and may go to normal. The absence of marked fever is one of the strong points in distinguishing tubal pregnancy from early abortion, with persistent bloody discharge and infection and salpingitis.

5. **Evidence of Internal Hemorrhage.** This will, of course, vary with the amount of blood lost internally. If the internal hemorrhage is free, the patient may be in collapse within a few minutes after the onset of the pain. In other cases the internal bleeding is so slight as to produce no effect on the patient's pulse or color—but it causes pain.

6. **Exacerbations of Pain without Apparent Cause and without Decided Elevation of Temperature.** This is characteristic of those cases of tubal pregnancy in which there are repeated slight internal hemorrhages.

In salpingitis, with the patient quiet in bed, such exacerbations of pain could be caused only by an increase in the inflammatory process, and this would be accompanied by a decided rise in temperature.

7. **Signs of Pregnancy.** Some of the early signs of pregnancy may be present—for example, stomach disturbance, or pain in the breasts, or softening of the cervix uteri. The serum test (p. 117) may be helpful.

8. **Absence of Intrauterine Pregnancy.** It may be very difficult to determine, in a given case, whether the trouble is tubal pregnancy with slight hemorrhage, or an incomplete abortion with persistent bleeding and mild sepsis and salpingitis. In such a doubtful case the uterus may be cleared out with the curet and the scrapings examined. If there has been recent pregnancy within the uterus, the microscopic examination of the tissues removed will show chorionic villi. If the trouble is tubal pregnancy, there will be no fetal structures in the scrapings.

This procedure is somewhat dangerous, for, if tubal pregnancy be present, a fresh hemorrhage and a serious one may be started by the manipulations. Consequently, curetment should be employed in these doubtful cases only when serious symptoms make a positive diagnosis necessary at once. In such a case the operator should have arrangements made so that immediate abdominal section may be carried out should threatening symptoms indicating internal hemorrhage arise during the process of curetment.

Usually in tubal pregnancy the internal hemorrhage is not severe at first, and there may be a number of these slight hemorrhages at intervals of a few days or a few weeks. The hemorrhages are not severe enough to affect the patient's pulse appreciably. They cause only pain and the evidences of pelvic inflammation. The symptoms and diagnosis in this class of cases are well shown by the following typical case:

Patient thirty-seven years of age. General health good. Had one child seven years ago. No pregnancy since. Never had any uterine or pelvic trouble. Menstruation was regular, every twenty-seven days, until about two months before I saw her. The last regular menstruation occurred December 3. The flow was in every way normal and at the right time. December 30 was the time for the next flow to appear, but it was missed entirely. The patient felt well and there was no reason why the menses should stop, aside from pregnancy. There was some nausea, the breasts began to enlarge and were somewhat painful, and the patient supposed herself pregnant. She felt well up to January 26. That was the day for her menses to appear, supposing she had not missed. The previous day she had been doing extra work, but slept well. In the morning she arose and went about her usual household duties, feeling well. About 8 a. m., while still engaged with her light work, she was seized with a sudden severe pain in the pelvis. The pain was intense. She managed to get to the bed and threw herself across the foot of it. Her physician was called and found it necessary to give morphine and to repeat it. This, of course, relieved her very much, but still the least change of position increased the pain and not until evening could she be moved enough to remove her dress and arrange her in bed. Her temperature as then 102°. In questioning her later, I could get no history of shock. The patient did not remember having felt particularly weak or faint or nauseated—she noticed only the severe pain.

Morphine and other preparations of opium were continued in small doses occasionally for several days. Hot stupes were applied to the lower abdomen and frequent doses of salts were given to relieve the constipation. The pain and soreness gradually became less. The temperature varied from 101° to 99°. On the third day a bloody vaginal discharge appeared. This was not like the menstrual flow, but was scanty and irregular. It continued a few days and then stopped. There were no membranes or large clots noticed. In about a week the patient was feeling so much better that she sat up for an hour or two. The pain then reappeared and she was obliged to return to bed. More or less pain and soreness through the pelvis continued, and this time she remained in bed ten days. There was more vaginal discharge, but it was not profuse nor irritating. It was occasionally streaked with blood. After ten days in bed she felt so well that she sat up in a chair for a short time. No disturbance following this, she sat up the next day a little longer. After five days she walked out to the dining room and helped about the table. She had then been free from pain for several days. The next day, however, the pain returned. It was not severe, but she remained in bed. The following morning the pain was worse, and I was then called in consultation—about three weeks after the beginning of the attack. I found the patient confined to her bed with pelvic pain and decided tenderness over all the lower abdomen. Good pulse, good color, temperature 99°.

On vaginal and bimanual examination I found marked tenderness all about the uterus. In the right tubal region there was a small hard mass about the size of the ovary, but much harder and not movable. In the left tubal region there was a larger, softer mass, which apparently occupied nearly all the left side of the pelvis. It was so soft that the borders were not distinct. Both masses were situated rather high, but there was so much tenderness that I could not press into the pelvis deep enough to satisfactorily outline them. There was apparently no exudate in the cul-de-sac of Douglas. There was a slight vaginal discharge streaked with blood.

Taking into consideration the history of the case and the findings on examination, I made a diagnosis of tubal pregnancy, with rupture three weeks previously and repeated slight hemorrhages since. I could not tell which tube the pregnancy was in, for there was a tender mass on each side of the uterus, so I would not venture a diagnosis in that respect. However, I was inclined to think that the pregnancy was situated in the right side, as that mass was the firmer and its outlines more distinct.

I advised that the patient be brought to the city at once for operation. You may think that rather risky advice for a case of ruptured extra-uterine pregnancy. But I was satisfied that the focus of disturbance was well surrounded by plastic exudate, and that a trip on the train with the patient flat on the stretcher all the time would not be attended with much risk, particularly in view of the fact that she had already been up and walking about. I had gone to the town prepared, of course, to do whatever was necessary at the house, but I concluded that the increased safety of the operation in a hospital outweighed the danger of the trip. The trip to the caused no particular disturbance. When I opened the abdomen I found blood-clots and adhesions about the left tube. The outer part of the tube was enlarged to the size of a lemon and contained the fetus and membranes still attached. The situation of the mass of blood clots and exudate was rather unusual. It was principally in front of the uterus, over the bladder. The small mass in the right side had no connection with the tubal pregnancy. It was the right ovary surrounded and bound down by adhesions. After the left tube and ovary had been removed and the mass of blood-clots cleared out, the right ovary was freed from its adhesions and left in place. The patient recovered without incident.*

In this case there was no evidence of sudden profuse loss of blood, and from my observations I am inclined to the opinion that this holds good in a large majority of cases of extra-uterine pregnancy.

Rupture with Profuse Hemorrhage. In exceptional cases there is a sudden loss of a large amount of blood into the peritoneal cavity. In such a case the symptoms are striking and urgent. The patient's face is blanched, her nose and forehead and fingers are cold, the pulse is rapid and weak and failing, a cold sweat appears on the face, respiration is short and labored—and over all is the intense pain, which is due to the blood spreading through the peritoneal cavity, and of which the patient complains as long as she has sufficient strength. These are desperate cases. This sudden profuse hemorrhage may appear with the first attack of pain, or the first hemorrhage may be slight, the severe hemorrhage taking place after several hours or several days. The following case, from my records, gives a practical idea of the clinical features of the cases of this class:

About nine o'clock one morning I was called by telephone to see a woman who, the message stated, was having severe pain in the abdomen. When I reached the house the pain had diminished considerably, but was still very troublesome. It was diffuse throughout the lower abdomen and was accompanied by marked tenderness over the same region. The abdominal muscles were tense. Movement of the patient in the bed or jarring of the bed increased the pain. Patient's color was good. Temperature was 99°. Pulse was 76, full and regular. There was a bloody vaginal discharge, which had appeared the day before and which the patient thought was her menstrual flow a few days delayed.

The history obtained was that the patient's previous health had been good, that menstruation had been regular (about every 28 days) and painless. Nothing out of the ordinary was noticed until one week before. It was then her time to come unwell, but the flow did not appear. She thought nothing of this, as she occasionally went a few days over time. She felt well and there was no nausea or other indication of pregnancy. In a few days a bloody flow appeared. This was not so free nor so dark as the regular monthly flow. But the patient supposed it to be the menstrual flow, and she continued to attend to her household duties without discomfort.

The morning I was called she had been superintending her household work as usual. While standing by a table she was seized with severe pain in the lower abdomen. She was lifted to a chair and the pain became less, and she ate breakfast. In an hour the pain had almost disappeared and she went upstairs, and felt very comfortable while sitting reading. She felt a desire to go to stool and during the bowel movement the pain returned with increased severity, so that she had to be helped to her room.

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*Report of Two Cases of Pregnancy Requiring Operation, by H. S. Crossen, M. D.—St. Louis *Medical Review*, August 24, 1901.

When I saw the patient, about an hour later, she was in good general condition, as already explained, and with no decided symptoms except the abdominal tenderness and pain on movement.

Vaginal examination showed the uterus slightly enlarged and softened, and the whole interior of the pelvis very tender. The least movement of the uterus caused pain. The pelvic tenderness was so marked that satisfactory bimanual examination was not possible. No mass could be felt to either side of the uterus nor behind it. The cervix was closed. The marked and widespread tenderness in the pelvis and lower abdomen showed there was something more serious than a simple miscarriage, which patient had concluded was the trouble. The sudden onset of intense pain, with complete absence of previous disturbance and without fever, excluded peritonitis due to inflammation of the tubes or appendix. There was no evidence of intestinal obstruction, or volvulus, or intussusception. The pain and hyperesthesia were not due to any drug habit, for the patient had no such habit. The diagnosis of extra-uterine pregnancy was fairly clear, in spite of the fact that no pelvic mass could be located. I wished to get the patient to the hospital before operating, and, as the first hemorrhage had evidently been slight, I though that by keeping her perfectly quiet for a day or two she could be safely moved. I gave orders accordingly.

The spontaneous pain in the lower abdomen subsided and the tenderness gradually diminished. By evening the patient was comfortable when perfectly quiet. The next morning the patient was much improved and was feeling comfortable—so comfortable that she did not consider herself very sick, and did not take kindly to the injunction to lie quiet in the bed and on no account to raise up. That afternoon the pain returned to some extent, but it was not severe, and I saw nothing to indicate that the patient would not be in good condition the next morning for the trip to the hospital, where a room had already been engaged for her. But near midnight I received a message that the severe pain had returned and that the patient was short of breath. Hurrying to the house, I found the patient in collapse. The pulse was small and rapid, the features were blanched and pinched—the greatest possible contrast to the rosy, robust appearance which she presented a few hours before. The extremities were cold, and a cold perspiration stood out on the face. Dyspnoea was present, but the patient complained only of the intense abdominal pain, which seemed to be increasing. The hemorrhage was still going on, as evidenced by the increasing widespread pain and the continued failing of the pulse. By the time the hasty preparations for the necessary operation were completed, the pulse was thready and at times scarcely perceptible. The patient told me afterwards that she believed she was dying, as she could feel the chill on the extremities creeping closer and closer towards the trunk.

When preparations were completed, the patient was etherized and the abdomen opened. The peritoneal cavity was full of blood. The ruptured tube was quickly located by touch and clamped. That stopped the bleeding temporarily. The principal part of the blood was then cleared out of the abdomen, the affected adnexa removed, the peritoneal cavity flooded with hot normal saline solution and the abdomen closed. The patient was almost pulseless and continued in that condition for 40 hours in spite of all stimulating means. Good reaction then gradually came on and the patient improved rapidly and made a perfect recovery. Subsequently she informed me that late in the afternoon before the nearly-fatal hemorrhage she was feeling so well that she sat up in bed to take nourishment and to chat with friends, regarding my strict admonition to keep perfectly quiet on her back as "overcautious."

DIFFERENTIAL DIAGNOSIS.

This subject is of interest to every one called to make a diagnosis in acute abdominal affections, for in many cases diagnosticated and operated on as tubal pregnancy the operation revealed that the trouble was not tubal pregnancy, but some entirely different affection. There are many conditions that may simulate one or more of the principal symptoms of extrauterine pregnancy, and these must be taken into consideration in the differential diagnosis.

The cardinal symptoms of early tubal pregnancy are (1) a missed menstruation, (2) sudden onset of pain (with or without shock), (3) bloody vaginal discharge, (4) a tender mass beside the uterus, (5) only slight fever, and (6) exacerbations of the pain and enlargement of the mass without corresponding elevation of temperature. In atypical cases there may be decided fever or onset of pains without missed menstruation or other variations from the rule. Again, the internal hemorrhage may be very severe at first, requiring a diagnosis at once before the appearance of later confirmatory evidences. It may be impossible to feel a mass, for the liquid blood itself gives no well-marked resistance and yet causes so much tenderness that the enlarged tube can not be satisfactorily palpated. Freshly coagulated blood gives a bogginess, but not a distinctly outlined mass. After a short time there develops a distinct mass, due to the fibrin and adhesions and infiltration associated with the blood clot.

The difficulties of differentiation are due largely to the fact that many cases of extrauterine pregnancy are atypical in symptomatology—presenting some of the prominent symptoms, but lacking others. Now, there are other affections that may present two or three of the prominent symptoms of tubal gestation, and if the distinguishing characteristics of the other affection happen to be absent or obscured a mistake in diagnosis is probable. Space will not permit consideration of all the conditions that may simulate tubal pregnancy; only a few of the more common ones may be discussed. These may be grouped into two classes—first, those conditions in which the principal feature is a tender pelvic mass, associated with some of the other symptoms of tubal pregnancy, and, second, those conditions in which the principal feature is sudden abdominal pain and collapse without apparent cause—i. e., without the disturbances that usually precede or accompany collapse from other diseases. These two main groups may be further divided into sub-groups. My object here is to put the reader in practical touch with the more common conditions that may simulate tubal pregnancy, that he may be on guard against them and thus avoid mistakes. The most satisfactory way to do this is to give actual examples—i. e., to describe the conditions present in cases that have actually simulated tubal pregnancy so closely that they were mistaken for it. In each of the following cases the symptoms were so deceptive that they caused a mistake in diagnosis. There is space for only one example under each of the deceptive conditions. Many other examples, with references, are given in a recent article* on the subject.

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*Conditions Simulating Tubal Pregnancy. by H. S. Crossen, M. D. Read in the Section on Obstetrics and Diseases of Women of the American Medical Association, at the Sixtieth Annual Session, held at Atlantic City, June, 1909.—*Jour. Am. Med. Assn.*, Vol. LIV, p. 519.

A Tender Pelvic Mass with Other Symptoms of Tubal Pregnancy.

Gonorrhoeal Salpingitis. With no other disease have I experienced so much difficulty in differentiation from early tubal pregnancy as with salpingitis of gonorrhoeal origin. Typical cases of salpingitis are, of course, easily distinguished from typical cases of tubal pregnancy. The difficulty lies in the fact that either may be atypical, and as they become atypical they may approach each other until their manifestations are practically alike—that is, gonorrhoeal salpingitis (atypical) may produce the symptoms and signs of tubal pregnancy (slightly atypical). Such cases are not very frequent, but they are encountered occasionally in the examination of a large number ot cases of supposed extrauterine pregnancy, and when encountered they prove most deceptive and misleading.

Chronic Gonorrhoeal Salpingitis.—Patient, aged 32, referred to me by Dr. J. D. Beatty, of Troy, Mo. Last normal menstruation August 10. In September went over time ten days. Felt as well as usual and supposed herself pregnant. No stomach disturbance or breast pains. About September 20 had a scanty flow for two days. She felt well and there was no further bloody discharge for two weeks, when it started again. A day later she was seized with severe pains extending all through the lower abdomen. No shock, just pain, at times cramp-like. This pain continued off and on for a week. Patient was confined to bed and had to be given morphine. A physician was called and made a diagnosis of abortion. No membrane passed and there was only one small clot. Patient was then curetted, but not much was obtained—apparently only some thickened endometrium. No fetus or membranes or shreds of tissue were seen at any time. Patient felt better after the curetment, but still continued sick, confined to bed with abdominal pain and tenderness. Temperature 99° to 100°. Twelve days later, as there was no material improvement, the uterus was curetted again, but without result. The trouble continuing, Dr. Beatty was called in consultation. The abdominal pains and tenderness continued and the temperature then (after the second curetment) ranged from 100° to 101°. Six days after the second curetment the patient was brought to St. Louis and placed under my care.

Examination.—This showed the uterus retrodisplaced and fixed, and blended with a tender mass of adnexal origin extending into both sides of the pelvis. The average temperature was 100°; pulse, 98; respiration, 20. The lowest temperature was 99.2° and the highest 100.6°.

Diagnosis.—There was evidently serious adnexal trouble of apparently recent origin, and any one of the following conditions was possible: (1) salpingitis following miscarriage, (2) an acute exacerbation of a chronic salpingitis, and (3) tubal pregnancy with repeated slight hemorrhages. Against the first were the low temperature (much lower than consistent with an acute infection of sufficient severity to cause the symptoms) and the absence of evidences of miscarriage. Against the second were the low temperature with acute symptoms, no history of preceding severe symptoms indicating old suppuration in the pelvis (though there had been mild pelvic distress for some years) and the association of the trouble with missed menstruation, followed by sudden onset of pain and the appearance of an irregular bloody vaginal discharge. If due to an old inflammatory trouble, one would expect the menstrual flow to be increased instead of missed, and the pain and other symptoms to be of rather gradual onset and increasing in severity as fluctuation appeared in the mass. In favor of the third (tubal pregnancy) were missed menstruation followed by sudden onset of pain, irregular bloody discharge, absence of positive evidence of a miscarriage, and the presence of fluctuation in the mass, associated with low temperature (much lower than was consistent with a pocket of pus). It seemed a fairly clear case of tubal pregnancy—one of the class frequently met, in which there is no great loss of blood at one time, but repeated slight hemorrhages with a gradually increasing mass. Accordingly that diagnosis was made.

Operation.—On opening the abdomen no tubal pregnancy was found. The trouble was chronic adnexal inflammation—there being a tubo-ovarian abscess on the left side, which gave the fluctuation, and chronic salpingitis on the right side, the remaining part of the mass being formed by adhesions and exudate. The damaged adnexa and the chronically inflamed appendix were removed and the uterus fastened forward.

The patient made a prompt recovery with complete relief.

Careful bacteriologic investigation of the removed adnexa showed no bacteria of any kind. This excluded recent infection. The case was evidently one in which there was a gonorrhoeal infection long ago (there were confirmatory facts in the history), the development of pyosalpinx with only slight symptoms of a mild character, the death of the bacteria (which commonly takes place in gonorrhoeal pyosalpinx), and the persistence of sterile pus in a sac which acted as an irritating foreign body in the pelvis. No evidence of pregnancy was found. Why the menstruation was missed I can not say. In some other cases of gonorrhoeal salpingitis I have encountered this misleading symptom.

Acute Double Salpingitis.—Patient, aged 19, referred to me by Dr. George F. Chopin, of St. Louis. About two weeks after marriage she failed to come unwell properly. At the menstrual time there was a slight bloody discharge, but not a good menstrual flow. There was some soreness and pain in the pelvis. After this had continued a few days she was seized with sudden severe pain in the lower abdomen, accompanied by shock. With the weakness and faintness and pain she could hardly move, even to turn over in bed, for several hours. The severe pain gradually subsided, but marked soreness remained, so much so that the patient was obliged to lie very quiet. A physician who was called examined the patient and said that she was having a miscarriage. A partial curetment was carried out, but only a small amount of blood was removed. No fetus, membranes or large clot was passed at any time. The patient and her husband then became uneasy at the apparent seriousness of the trouble and the day after the curetment called Dr. Chopin, who asked me to see the patient.

Examination.—The patient was confined to bed with pain in the lower abdomen and a bloody vaginal discharge. There was marked tenderness on abdominal and bimanual examination, and there was a boggy induration on each side of the uterus with marked tenderness. No membranes or shreds were found in the cervix or in the bloody discharge. The discharge was blood and mucus, without noticeable pus admixture. The trouble seemed to be around the uterus rather than in it. The temperature was low, fluctuating between 100° and 101°. Here was a patient, apparently previously healthy, seized with a severe abdominal pain and decided shock, associated with imperfect menstruation, an irregular bloody discharge, a tender mass partially surrounding the uterus, and low temperature. I made a tentative diagnosis of tubal pregnancy with some internal hemorrhage, but, not being entirely satisfied, I concluded to watch the case for a while.

Under mild sedatives and strict confinement to bed the patient became very comfortable. The temperature ran about 100°. After a few days she felt so much better that, without my permission, she began to go to the washstand. On one of these trips across the room she was seized with pain and almost fainted before she could reach the bed. There was then more pain and pelvic soreness and an increase in the tender mass about the uterus. I then insisted on the patient's removal to the hospital, where she was kept under observation for five days longer. On admission the temperature was 101.2°; pulse, 100; respiration, 24. There was considerable abdominal pain, requiring a sedative occasionally. The next day the temperature was 99° and for four days did not go above 99.6°. In the meantime the patient felt comfortable, could sleep well, her appetite returned, and the pelvic soreness diminished. The bloody discharge continued. The fifth day, without apparent cause, the abdominal pain returned and became very severe. The pulse rose to 132; temperature, 100.6°; respiration, 24. On examination the tender pelvic mass was found to be larger. The tentative diagnosis of tubal pregnancy seemed confirmed by the spontaneous recurrence of severe pain, the rapid pulse, and the continued enlargement of the pelvic mass with low temperature.

Operation.—When I opened the abdomen I found there was no extrauterine pregnancy, but instead an acute double salpingitis, with leakage of pus into the peritoneal cavity and the formation of extensive adhesions. The tubes were so badly damaged that I thought best to excise them. After establishing free drainage of the infected area, I explored the interior of the uterus, thinking that possibly there had been a miscarriage after all, with infection following it; but no evidence of pregnancy was found.

The patient recovered without particular incident.

Examination of the pus from the tubes showed gonococci in abundance and in pure cultures. The case was one of gonorrhoeal infection following marriage, the infection affecting the vagina but slightly and passing rapidly up into the uterus and tubes and out into the peritoneal cavity. A striking fact, and perhaps the most misleading one in this particular case, was the absence of the usual evidences of acute gonorrhoeal vaginitis (burning on urination, vaginal tenderness, and free purulent discharge). These were so slightly marked that there was no suggestion of the trouble being acute gonorrhoea. The purulent character of the discharge was obscured by the blood in it. Had I examined the discharge microscopically, gonorrhoea would at once have been evident.

It may be thought that some fever is enough to exclude tubal pregnancy as the causative factor, but such is not true, for in many cases of extrauterine pregnancy with hemorrhage the temperature will run up temporarily to 102° and higher. The following is a case in point: Mrs. P., aged 31, admitted to the Gynecologic Department of Washington University Hospital. On admission her temperature was 101.4 and pulse 140. She gave a clear and typical history, and the diagnosis of ruptured tubal pregnancy was positive. The hemorrhage had been so severe, however, that she was in very poor condition for operation. The hemoglobin had been reduced to 30 per cent., which made operation or even anesthesia alone very dangerous. As the hemorrhage had stopped and she was improving, it was decided to defer operation until it could be carried out with less danger. The waiting period was seven days. During that time the temperature went up to 102° nearly every day and one day reached 103.4. After seven days the blood condition had improved (hemoglobin above 40 per cent.) and she was so much improved otherwise that operation was carried out. There was no pus in the peritoneal cavity—simply the unabsorbed blood. The patient recovered promptly.

Miscarriage with Abnormalities. Various conditions associated with miscarriage may lead to a mistaken diagnosis of tubal pregnancy—for example, an old inflammatory mass or a tumor.

Miscarriage and Ovarian Tumor.—Reported by Brown. A patient who had missed the menstruation for three weeks, and had all the symptoms of pregnancy, was attacked with pains through the lower abdomen. A physician was called and found the patient confined to bed, with abdominal [illegible] suppression of urine, temperature of 102.5°, and evidently [illegible] cause.

Examination.—The uterus was found pushed back by a large mass in the right side of the pelvis. The physician watched the case for four or five days, and felt confident that the trouble was tubal pregnancy, with rupture, hemorrhage, and resulting inflammation. Dr. Brown, who was asked to see the case, made the same diagnosis.

Operation.—This revealed an ovarian cyst and general peritonitis. Exploration of the interior of the uterus showed that there had been a recent abortion. The miscarriage was evidently the cause of the peritonitis, which eventually proved fatal.

Miscarriage and Broad-Ligament Tumor.—Reported by Fortun. This case presented practically the same features as the preceding one—namely, missed menses, abdominal pain, bloody discharge and a tender mass beside the uterus. Diagnosis, extrauterine pregnancy. Operation demonstrated that the symptoms were due to a tumor (sarcoma) of the broad ligament, associated with an abortion.

Pregnancy with Abnormalities. There are various anomalous conditions that may cause an intrauterine pregnancy to simulate an extra-uterine pregnancy.

Pregnancy with Hydatidiform Mole.—Mrs. S., aged 21, came into my service at the St. Louis Mullanphy Hospital with a diagnosis of extrauterine pregnancy. There had been no menstruation for two months, and there were the usual symptoms of early pregnancy. Recently the patient had been having attacks of pain in the lower abdomen, accompanied by a bloody discharge. These attacks of pain had been irregular—at times severe and confining her to bed, while at other times she was able to be about the house. Finally they became so disabling that she was brought to the hospital.

Examination.—When I saw her she was confined to bed, with a mass the size of an orange pushing forward the anterior abdominal wall just above the pubes. The mass was firm, painful on pressure, partially fixed, and it was here that the patient located the pain and distress. There was a bloody vaginal discharge. Temperature, pulse and respiration were practically normal. On bimanual examination the deeper portion of the mass could be made out, and it was found to be the size of a child's head. Indistinct fluctuation was obtained. The body of the uterus could not be made out, but the impression obtained was that the mass lay in front of the corpus uteri, which was pushed backward and could not be felt on account of the mass. The forward projection of the mass against the abdominal wall was very marked.

I was inclined to agree with the diagnosis of extrauterine pregnancy, but was not entirely satisfied, as I had not located certainly the body of the uterus. I concluded to watch the case for a while. The patient was kept absolutely quiet and sedatives were given as needed for the pain. The patient was better for a time, but later the pain recurred. It troubled her every day, at times quite severely, but could not be identified as uterine contraction pains. No variation in the consistency of the mass was noticed. The bloody discharge continued. A few very small clots were noticed, but no membranes or shreds. I continued the observation for ten days, and the longer I observed the more confusing the conditions became. The process, whatever it was, was progressing rather rapidly. In the ten days the mass had enlarged decidedly and the pain had increased—so much so that at the end of the period it was evident that something must be done, as further prolongation of the trouble would seriously weaken the patient, who was not very strong at the beginning. The crucial point, which so far I had been unable to decide, was whether the mass was uterine or extrauterine.

Operation.—I decided to examine the patient under anesthesia, having everything ready to operate in case the mass proved to be extrauterine. Under the complete relaxation of anesthesia I was able to determine that the cervix expanded symmetrically into the mass, which was thus identified as the body of the uterus. It was found, however, to be twice as large as it should be at that period of pregnancy. This abnormal enlargement with the prolonged bloody discharge and the increasing pain made it evident that there was some serious pathologic condition within the uterus and not a normal pregnancy. I dilated the cervix slightly, and there escaped several small cysts. That made the diagnosis plain, and I then dilated the cervix widely and removed from the uterus a beautiful specimen of hydatidiform mole. The uterine cavity was literally packed with the grape-like bunches of minute cysts characteristic of this condition. No trace of a fetus as found. The patient recovered without further trouble, and has since given birth to two children, the pregnancy, labor and puerperium in each case being normal.

Pregnancy with Hysteria and Uterine Displacement.—While I was in charge of our city hospital for women (St. Louis Female Hospital) a patient was brought into that institution on a stretcher, suffering severe abdominal pain and apparently very sick. The suffering was so great that the history was obtained with difficulty. She had missed the menses about four months, and the usual symptoms of pregnancy had been succeeded by irregular attacks of pain, which culminated in the severe attack which caused her to be hurried to the hospital.

Examination.—The abdomen was sensitive and the muscles rigid. In the right lower abdomen there was a distinct mass, very painful to touch. On bimanual examination it was found that this mass extended down into the right side of the pelvis, which it largely filled. It was about the size of a child's head, extremely tender, apparently fixed and presenting indistinct fluctuation. The cervix was somewhat softened. The body of the uterus could not be made out on account of the marked tenderness and the resulting muscular rigidity, which interefered with deep palpation. The pulse was rapid, but of fair volume. There was no fever. I was quite certain that the trouble was extrauterine pregnancy. Examination under anesthesia, however, showed that it was an intrauterine pregnancy. The fixed and tender mass in the right side was the pregnant uterus, which was freely movable under anesthesia.

After the examination the symptoms largely disappeared and the patient was able to leave the hospital in a short time. The misleading features were the severe abdominal pain and tenderness, associated with a lateral pelvic mass, which was extremely tender (hysterical hyperesthesia) and fixed (by the rigid condition of the abdominal muscles), and which could not be identified as the body of the uterus (because of the marked softening just above the cervix, and also because of the impossibility of deep palpation). Anesthesia removed the difficulties at once and permitted a correct diagnosis.

This case and the preceding one serve to emphasize the necessity of careful examination under anesthesia before operation in all such doubtful or uncertain cases. It must be kept in mind, however, that when tubal pregnancy is suspected the patient should be placed in a hospital and prepared for operation before the examination under anesthesia is made, for if the trouble is tubal pregnancy the manipulations of the examination may cause rupture and hemorrhage, requiring immediate operation.

Pregnancy with Irregular Softening of Uterus.—A patient with supposed extrauterine pregnancy was brought to St. Louis by her physician and placed under my care. About five months previously she had missed her menses and presented the usual symptoms of pregnancy. Three months later she had abdominal pains accompanied by a bloody discharge from the uterus. The bleeding stopped, but the pain recurred at irregular intervals and there was an enlarging mass, which could not be identified as part of the uterus. Her physician called several others in consultation and the consensus of opinion was that the pregnancy was extrauterine; hence she was brought to St. Louis for operation.

Examination.—I found a very puzzling condition. The body of the uterus was irregular in shape and irregularly softened, and gave at first the impression of a fairly firm mass not connected with the cervix, the portion immediately above the cervix being so softened as to be hardly palpable. After examining for some time it was finally determined that the mass was the enlarged and pregnant corpus uteri. The rhythmical hardening of the uterine wall aided materially in the differentiation. By prolonging the examination I was able to feel the previously softened portion harden under the finger, and could then make out that the upper part of the cervix expanded symmetrically into the mass in question. After working out the diagnosis I was able to demonstrate it satisfactorily to the patient's physician, who examined her with me.

Pregnancy with Retroflexed Uterus.—Reported by Royster, aged 22, married sixteen months, missed her menses three times in succession, had nausea and vomiting, and also tenderness of the breasts. Then she had an attack resembling cholera morbus and a slight bloody stain from the genitals, but no distinct hemorrhage. The signs of pregnancy then became less marked. She complained of pain in the lower abdomen, especially in the left side, and of frequent and painful urination.

Examination.—There was found a mass chiefly in the left side of the pelvis and pressing down the posterior vaginal fornix. It was boggy and tender to the touch. The uterus appeared to be pushed to the right side and was intimately associated with the mass. A sound was readily introduced into the uterus to the depth of three inches, indicating that the uterus was about normal in depth and was empty. A diagnosis of extrauterine pregnancy was made and the patient operated on accordingly.

Operation.—This revealed a retroverted pregnant uterus, twisted somewhat toward the left, and with the wall softened irregularly. There was no extrauterine pregnancy. The uterus was brought into correct position and a small cyst of the ovary removed. The patient recovered without incident and the pregnancy continued.

Pregnancy and Salpingitis.—Reported by Leopold. Patient, aged 32, mother of five children, missed menstruation and had abdominal pains and bloody discharge. Examination showed a painful mass occupying the posterior cul-de-sac. Diagnosis, extrauterine pregnancy. Operation revealed an intrauterine pregnancy, with an associated salpingo-oophoritis, probably of gonorrhoeal origin. The mass formed by the inflamed tube and ovary was low in the cul-de-sac. Patient recovered.

Pregnancy with Torsion of Enlarged Tube.—Reported by Morel. Patient, aged 32, mother of four children, missed menstruation. After a time she was seized with severe pain in the left lower abdomen, had vomiting, rapid pulse and no fever. The uterus was somewhat enlarged and softened, and a tumor was felt back of it. Operation showed a pregnant uterus with a posterior mass, as large as a turkey's egg, formed by the left tube. The pedicle of the enlarged tube was twisted six times and the interior was filled with blood (hematosalpinx).

Tumor with Anomalous Symptoms. When a pelvic tumor, previously unrecognized, happens to be accompanied with missed menstruation and sudden pain and decided tenderness, the resemblance to tubal pregnancy may be most misleading.

Broad Ligament Cyst, with Intracystic Hemorrhage.—Mrs. D., aged 26, admitted to the Gynecologic Department of Washington University Hospital. Married five months. Previous menstrual history normal—menses regular in appearance, duration four days, no pain. One month after marriage menstruation was missed for seven days. Then a bloody flow appeared. It was profuse, accompanied by clots and lasted about nine days. About two weeks later the patient had a fall, which was followed by pain in the left side of the pelvis and lower abdomen, and this persisted. The succeeding months there was a menstrual flow, but it was less than the usual amount. The patient continued sick, and had to give up work and was obliged to lie down at times. There was loss of appetite and for two months decided nausea when riding in a car, but this became less. There was also tenderness of the breasts, which had diminished during the last month. There had been no fever. The patient complained of pain in the left lower abdomen. Temperature was 99°, pulse 90, and respiration 20.

Examination.—The uterus was found forward, to the right and movable. The left side of the pelvis was occupied by a mass the size of a large orange, fluctuating and tender on palpation. The diagnosis was doubtful, with the probability in favor of tubal pregnancy.

Operation.—This revealed a parovarian tumor (cyst) into which hemorrhage had taken place. The cyst was easily enucleated from its bed in the broad ligament, and subsequent examination of it in the laboratory positively excluded extrautĕrine pregnancy. The patient recovered without particular incident.

Parovarian Cyst with Twisted Pedicle and Salpingitis.—Patient, aged 22, admitted to Gynecologic Department of Washington University Hospital, very ill and complaining of pains through the lower abdomen.

Examination.—A large mass was found, filling the right side of the pelvis and extending up into the lower abdomen, half way to the umbilicus. This was painful on palpation and indistinct fluctuation could be made out. The uterus was pushed to the left. All the pelvic structures were apparently bound together and fixed by adhesions. Patient was pale and complained of a constant pain in the abdomen, of a dull character. Temperature, 99°; pulse, 80; respiration, 20. For ten weeks past the menstruation had been very irregular. For nearly a month there was a constant bloody discharge, then it stopped for a few days, then came on again for a few days, and then stopped entirely. For five weeks before entering the hospital there was no menstruation, not even a trace of blood. There was free mucopurulent discharge. During the period mentioned there had been considerable pain throughout the abdomen, and two weeks before entering the hospital the patient had had a very severe attack of pain. She was confined to bed for a few days and had been lying down off and on ever since. The mass was too large and of too rapid development to be due to the inflammation, which was apparently of mild grade. There was no previous history of a tumor. There had been some pain, off and on, during the previous year, but nothing to suggest serious trouble.

The patient was kept under observation for seven days. The temperature ranged from 98° to 99.4°, once going to 100°, but never higher. The pulse ranged from 80 to 92. The mass continued to enlarge and the pain increased, requiring sedatives, in spite of the fact that the patient was kept absolutely quiet in bed and that the temperature continued low. There had been a tentative diagnosis of tubal pregnancy, and this progress under observation and the continued absence of the menstruation tended to confirm it.

Operation.—The mass was found to be a parovarian cyst with twisted pedicle, universal adhesions and a complicating pyosalpinx of the same side. Free drainage was employed and the patient recovered.

Abdominal Pain and Collapse.

When a married woman in the child-bearing period is seized with severe abdominal pains, without apparent cause, and passes into the condition of collapse associated with severe internal hemorrhage, we naturally think of ruptured tubal pregnancy as the most probable cause. If there happens to be missed menstruation or some of the other symptoms of tubal pregnancy, and the examination reveals nothing else to account for the pain and shock, a tentative diagnosis of tubal pregnancy and action accordingly is certainly justified. As prompt action may be necessary to save the patient's life, such action must sometimes be taken on evidence which would be considered insufficient were the indications less urgent. Under such conditions the diagnosis of ruptured tubal pregnancy is largely a matter of exclusion, for, as previously stated, the pelvic examination often gives no definite evidence beyond the tenderness. Hence the importance of carefully considering other conditions that may cause these symptoms. There are many such conditions, but I shall mention only certain ones which are especially liable to be confounded with ruptured tubal gestation.

Hemorrhage from Ovary.—Weinbrenner reports two cases in which hemorrhage into a corpus luteum, already in cystic degeneration, burst the wall of the cyst. Free hemorrhage into the peritoneal cavity followed. In one instance the tendency to hemorrhage was increased by torsion of the pedicle of the cystic ovary. The clinical diagnosis in each case was extrauterine pregnancy, but microscopic examination of the removed specimen showed positively that there was no pregnancy.

In cases of ovarian hemorrhage, care must be taken to exclude ovarian pregnancy at the site of the hemorrhage before deciding that it is due to some other condition. Some of the so-called "blood cysts" of the ovary are, no doubt, unrecognized instances of ovarian pregnancy. The following is a case in point: Reported by J. K. Kelly. He operated on a woman, aged 33, for supposed extrauterine pregnancy and found only a blood cyst of the ovary about the size of a plum. The ovary was removed and the case set down as one of mistaken diagnosis. Some months later, and quite incidentally, a microscopic section was made through the wall of the little cyst, and examination of this showed chorionic villi. A careful and systematic examination was then made of the small cyst and its surroundings, and it proved to be a beautiful specimen of early ovarian pregnancy.

Ovarian Cyst with Rupture.—Reported by Vineberg. In his office he was examining a woman on account of discomfort in the lower abdomen associated with delayed menstruation. The patient was stout and the bimanual examination was difficult. The uterus was enlarged and to the left of it was a cystic mass the size of a small orange. While palpating this mass it suddenly ruptured and the patient promptly went into syncope. It was supposed that a tubal gestation sac had ruptured, with resulting intraperitoneal hemorrhage. After a little time the patient rallied, and as the symptoms were then not so urgent she was kept under observation for a couple of days. Improvement was so marked that it was decided that the ruptured mass must have been only a small cyst of the ovary instead of a tubal pregnancy. There was no further trouble.

Hematosalpinx with Severe Bleeding.—Brettauer reported a case of severe internal hemorrhage, supposedly due to ruptured tubal pregnancy. The patient went into collapse and became too weak for operation. Later she rallied and the operation was carried out. A hemorrhagic swelling, the size of a walnut, was found in the middle third of one tube. From this the severe bleeding had taken place. The inner and outer portion of the tube were apparently normal. The swollen area had the appearance of a tubal pregnancy and was excised as such. When sectioned and examined microscopically no tubal pregnancy was found. The specimen was then sectioned serially and examined most carefully, and the result was absolutely negative so far as evidence of tubal pregnancy was concerned.

The fact is sometimes overlooked that tubal swellings of hemorrhagic character are not necessarily due to pregnancy in that situation. Since Tait's famous dictum, that "hematosalpinx is always due to extrauterine pregnancy," there has been a tendency among operators to look on this as a rule without exceptions. That there are exceptions, however, there is abundant proof. A number of well-established cases have been reported. As a rule, such differentiation is not of great practical moment, for the reason that treatment of the two conditions is the same—namely, removal of the damaged tube. In some cases, however, it may be extremely important to determine certainly the character of the mass before expressing an opinion as to what it is. Such an instance came to my notice. I was not connected with the case, but was apprised of the facts afterward. Some years ago a pupil nurse in one of our hospitals was attacked with serious abdominal disturbance requiring operation. When the abdomen was opened there was found a hemorrhagic condition of one tube resembling tubal pregnancy. The operator at once pronounced it tubal pregnancy in the presence of several internes and nurses. The information spread through the hospital with a result to be easily imagined. The young woman recovered from the serious operation only to find herself in a situation almost unbearable, and she finally left. In the meantime, examination of the mass by a competent pathologist showed that it was not a tubal pregnancy and that a most serious mistake had been made in pronouncing it such.

Tubo-ovarian Hemorrhage.—Bovée reported a case in which, at operation, there was found a tubo-ovarian hemorrhagic mass, supposed to be tubal pregnancy, but which proved to be only inflammatory. Both the tube and ovary were distended with blood, and there was a small opening through the fimbriated extremity connecting the two cavities. The hemorrhage apparently originated in the ovary, and the free intraperitoneal bleeding came through a small rupture in the wall of the ovarian blood-cyst. A thorough microscopic examination demonstrated that there was no pregnancy either in the tube or ovary.

Bovée mentioned cases of tubal and ovarian hemorrhage, not due to extrauterine pregnancy, reported by Price, Newman, Griffiths, Briggs, Croom, Paul, Ruge, Goodell, Duncan, Pilliet, Maurange, Peuch and Doran. He referred also to cases occurring in virgins at an early age, reported by Fordyce; to fatal cases reported by Walter, Lewis and Fowler; to cases successfully treated by abdominal section, reported by Boldt, Alloway, Knaggs, and Johnson, and to the celebrated cases of Scanzoni in which at an autopsy on the body of a young girl, dying suddenly during menstruation, three liters of blood was found in the peritoneal cavity. These hemorrhages from the non-pregnant ovary (ovarian apoplexy, blood-cysts, follicular hemorrhage, etc.) and from the non-pregnant tube (hematosalpinx) are usually due to inflammatory changes, causing degeneration of the tissues and of the contained blood vessels. Occasionally a tumor of the ovary or tube is the causative lesion.

Many other conditions have been mistaken for tubal pregnancy (on account of sudden collapse associated with abdominal pain)—for example, hemorrhage from a varicose vein of the broad-ligament, salpingitis with collapse, perforative appendicitis with a pelvic tumor, and fulminating pelvic edema.

Numerous illustrative cases have been reported, but there is not space for these here. Fulminating pelvic edema will be considered later (page 795).

Conclusions.

1. Gonorrhoeal pyosalpinx, after the acute symptoms subside, may lie dormant and unsuspected for a long period (four years in one reported case). During this quiescent period the pus-tube (containing sterile pus usually) is tolerated the same as a small tumor or other non-irritating body—the patient being practically well and without decided pelvic disturbance.

Such a quiescent pus-tube may at any time give rise to an acute exacerbation, and the onset of the pain may be so sudden and apparently causeless as to suggest tubal pregnancy. This suggestion is strengthened by the continued enlargement of the mass (from irritative exudate) without decided fever (for the pus is sterile). Accompanying the exacerbation or preceding it there are sometimes other symptoms that we associate with tubal pregnancy—viz., missed menstruation, stomach disturbance, tenderness of the breasts, and softening of the cervix uteri. The last three are accounted for by the peritoneal and periuterine irritation and congestion, but why there should be delayed or missed menstruation at this inopportune time I do not know. One would suppose that the irritation and pelvic congestion would cause the menstrual flow to be excessive rather than absent. It is possible that the temporary suppression of menstruation (from some nervous disturbance or other obscure cause) stands in a causative relation to the acute exacerbation with its subsequent symptoms. I offer this simply as a suggestion toward a possible explanation of this strange and misleading sequence of events (the missed menstruation followed by the other symptoms detailed).

In cases of supposed tubal pregnancy of the type mentioned particular care should be taken to exclude chronic gonorrhoeal salpingitis, as follows: (a) by inquiring into the patient's history for evidences of specific vaginitis or urethritis, and for subsequent pelvic symptoms (an inquiry into the husband's history also may bring out valuable information); (b) by a careful examination for evidences of a chronic urethritis, Bartholinitis, endometritis or salpingitis; and (c) by staining for the gonococcus any suspicious discharge that may be obtained from the urethra, vulvovaginal glands, uterus or vagina. In chronic cases negative findings do not exclude gonorrhoea, for the gonococcus disappears from the discharge after a time.

2. In rare cases acute gonorrhoea may extend rapidly through the uterus to the tubes and peritoneum, with so little disturbance of the vagina and vulva as to arouse no suspicion of its presence. In such a case the acute peritoneal symptoms will come on suddenly and without apparent cause. If there happens to be also delayed or scanty menstruation, tubal pregnancy may be suspected. And this suspicion is strengthened by the stomach disturbance, the softening of the cervix and the enlarging mass beside the uterus. In my case above mentioned the diagnosis was further obscured by the curetment, which modified the discharge, and by the continued low temperature, which

seemed to exclude acute inflammation. In all such doubtful cases with acute discharge it is advisable to examine for gonococci, even though the discharge be scanty and bloody and apparently non-purulent.

3. An early miscarriage, if associated with a tumor or followed by mild salpingitis, may very closely simulate tubal pregnancy. Membranes may be passed in either condition. With a miscarriage there is an embryo, but it often passes unnoticed. If a shred of tissue is passed, it may be examined for chorionic structures. In a case which can not be decided otherwise, curetment is advisable to obtain tissue for microscopic examination for chorionic villi. But in suspected tubal pregnancy such a curetment should not be carried out until the patient is in a hospital and prepared for abdominal section, for the manipulations may start internal hemorrhage, requiring operation at once.

4. A pregnant uterus may present very misleading conditions—e. g., irregular softening (so much so that the body seems to be a firm mass entirely separate from the cervix), displacement, backward or forward or laterally; hyperesthesia with displacement, or irregular softening or an associated lateral mass (salpingitis, etc.). If there is in addition an anomalous history, a mistake is quite probable.

5. An unsuspected tumor in the pelvis may give rise suddenly to severe disturbance, and if there happen to be present also some of the symptoms of early pregnancy, a diagnosis of extrauterine pregnancy is very probable. The cases mentioned above show that the early symptoms of pregnancy (missed menstruation, stomach disturbance, breast tenderness and softened cervix uteri) often appear without satisfactory cause and at most inopportune times.

6. Ovarian hemorrhage or tubal hemorrhage, due to other conditions, may so closely simulate extrauterine pregnancy as to be indistinguishable before operation, and in some cases the matter is in doubt even after direct exposure and handling of the affected structures. In this connection there are three points to be kept in mind: (a) There may be slight hemorrhage from the tube or ovary, particularly at the period of menstrual congestion, not due to extrauterine pregnancy and not requiring operation. (b) In cases of tubal hemorrhage requiring operation the hemorrhagic condition of the tube is not necessarily due to pregnancy, and in doubtful cases should not be pronounced such until after confirmation by microscopic examination. (c) In a hemorrhagic condition of the ovary requiring removal of the same, a careful examination should be made to determine exactly the pathologic condition. Such a supposed simple "blood cyst" of the ovary may prove on careful microscopic examination to be an early ovarian pregnancy.

7. Salpingitis, appendicitis and perforations in the gastro-intestinal tract may, in rare cases, come on so suddenly and progress so rapidly as to suggest internal hemorrhage from extrauterine pregnancy. Usually in these conditions there are preceding or accompanying symptoms which point to the true nature of the disease. If these distinctive features are absent and

there happen to be some of the other symptoms of tubal pregnancy, a mistaken diagnosis is probable.

8. Fulminating pelvic edema, with its sudden onset and the rapid development of alarming symptoms, may closely resemble extrauterine pregnancy. In my own case, cited later, the temperature was so high that it was easily distinguished as an inflammatory trouble and not a hemorrhage, but in other reported cases this feature was lacking and mistaken diagnoses of extrauterine pregnancy were made. In this, as in other conditions of non-hemorrhagic shock or depression, there is not the persistently blanched condition of the skin so characteristic of profuse hemorrhage. The pulse, also, though rapid, is likely to have better volume than after a severe hemorrhage.

9. It is evident that the diagnosis of extrauterine pregnancy must rest on the combination of several symptoms. No one fact is sufficient, and it is hazardous to depend on two or three facts unless they are especially strong and well marked. In most cases the diagnosis must be reached by a careful consideration of all the symptoms present and the definite exclusion, one by one, of other conditions which may produce similar symptoms.

TREATMENT.

In pointing out the treatment for extrauterine pregnancy, several clinical classes must be considered—namely (1) before rupture, (2) hematocele, (3) repeated moderate intraperitoneal hemorrhage, (4) profuse intraperitoneal hemorrhage, (5) hematoma, and (6) advanced cases.

1. **Before Rupture.** The only safe line of treatment in this stage is abdominal section and removal of the pregnant tube as soon as the diagnosis is fairly certain. The patient is in constant danger of a sudden serious hemorrhage, hence the sooner she is operated on the better. If the tube is lying low in the cul-de-sac, it might be reached and ligated from below (vaginal section), but this is not an entirely safe undertaking. The manipulations may serve to start a sudden severe hemorrhage which could not be promptly checked from below, particularly as these pregnant tubes are frequently bound in place by old adhesions. The safest operation in this stage is removal of the pregnant tube by abdominal section.

2. **Pelvic Hematocele** (Fig. 662). In these cases the hemorrhage has long since ceased and the collection of blood in the pelvic cavity is well shut off from the general peritoneal cavity by plastic exudate and adhesions. The embryo and membranes have probably escaped from the tube, either through a rupture in the wall or more frequently through the end of the tube by "tubal abortion," and perhaps have been largely absorbed.

Practically all that remains is the blood in the pelvis, with the exudate end adhesions around it. This forms a tender mass low in the cul-de-sac back of the uterus, without much disturbance higher.

In such a case it is well to watch the patient for a while, in the meantime keeping her quiet in bed. In the course of a week or ten days there will probably be decided improvement, showing that nature is taking care of the blood and exudate and that the patient will probably recover without operation, or renewed evidences of irritation will appear, showing that embryo and membranes are still growing or that the blood and exudate is acting as a persistent source of irritation. When there is persistent irritation after this period of rest, operation is indicated.

The choice of operation depends on the circumstances of the case. If the evidences of irritation (pain and tenderness) are all low in the cul-de-sac, the probability is that evacuation of the blood from the cul-de-sac by vaginal section will be all that is necessary. If the pain and tenderness extend into the upper part of the pelvis, abdominal section is the safer operation. When the conditions are doubtful, the abdominal route should be chosen.

In a case where a hematocele is to be evacuated by vaginal section, the patient should be prepared for an abdominal section also, for there is a possibility of the vaginal manipulations starting an internal hemorrhage which could not be satisfactorily controlled from below.

3. **Repeated Moderate Intraperitoneal Hemorrhage** (Fig. 663). This class comprises the majority of the cases of tubal pregnancy. The usual course of such a case is well shown in the typical case previously described (page 774) The treatment is abdominal section as soon as the diagnosis is positive and the patient can be gotten to a hospital and given the regular careful preparation for that operation.

4. **Profuse Intraperitoneal Hemorrhage** (Figs. 664, 665). In these cases immediate abdominal section is advisable as a rule if the patient is within reach of an experienced abdominal surgeon and can be gotten into suitable surroundings. In the absence of an experienced operator and suitable facilities, operation had best be deferred.

In operations for the various classes of cases of extrauterine pregnancy, as well as other conditions in which abdominal section is required, the patient's chance of recovery is greater if the operation can be conducted in a well-ordered hospital. Consequently, the patient should be taken to a hospital if possible. Even a trip on the train, with the patient on a stretcher and in a strictly recumbent posture all the time, is less hazardous than operation in poor surroundings. The marked emphasis which teachers and writers generally have placed upon promptness of operation in extrauterine pregnancy has unfortunately led to considerable indiscriminate operating in these cases—operations on patients in which it would have been safer to wait a while, operations without adequate antiseptic preparation, operations by persons without sufficient surgical experience to handle the serious intra-abdominal conditions in a safe and effective way. Even in the restricted class of cases in which there is free intraperitoneal hemorrhage, the socalled "tragic" cases, it is probable that not many patients really die at once from the loss of blood. There are some that do, but they are comparatively few, as indicated by mortuary records and by the number of patients that come to operation later with a history of [illegible] a severe attack of intra-peritoneal hemorrhage. [illegible] the resulting peritoneal irritation and inflammation coming on within a few days or a few weeks, that constitutes the greatest menace and that causes the death, rather than the mere withdrawal of a certain amount of blood from the circulation at the primary rupture. This being the case, the patient has a better chance of surviving the primary loss of blood if simply kept quiet without operation, than if operated on at an inopportune time or without reliable antiseptic preparation, or by a person without adequate experience in abdominal surgery.

In most of these cases the hemorrhage has ceased by the time the physician reaches the patient. Whether this is the case can be determined with a fair degree of certainty, as a rule, by watching the patient for a short time. If the hemorrhage has ceased, it will be seen that the pain is diminishing and the pulse getting better. If it is decided to defer operation until the patient has recovered from the shock and the acute anemia, the patient must be kept quiet in the horizontal posture absolutely and should make no voluntary movement; no sitting up, nor moving of the extremities nor straining; no enemata nor purgatives. If she is to be moved to a hospital, it must be with practically no more disturbance than if she were lying flat in bed. For the first 48 hours avoid bowel movement if possible and give very little food. The severe thirst, caused by the blood loss, may be relieved by small doses of water, and by saline solution per rectum by the drop method (proctoclysis). Pain and restlessness are to be relieved by sedatives hypodermically or by mouth. Guard against vomiting and avoid pelvic examination, for either is very likely to start up fresh hemorrhage. After the first two or three days a little more freedom may be allowed as regards nourishment, enemata and movement of arms and legs. But the patient must maintain the horizontal posture strictly. The patient must be especially warned against straining in any way and against trying to sit up a little because she feels better. An attempt at sitting up in bed may undo all the good of the previous rest, as shown in the case mentioned on page 777. Where the hemorrhage has been very severe it will usually require ten days to two weeks for the patient to recuperate sufficiently to present a good margin of reserve force for the operative work. With a less abundant internal hemorrhage the patient may be in good condition for operation within a few days.

It must not be forgotten that in these cases there is always the possibility of the hemorrhage starting up again suddenly, in spite of the care to prevent it. Consequently, I always feel better if the patient is in the hospital while waiting for her "deferred operation." Then, if renewed hemorrhage develops, operation can be carried out promptly before the patient again passes into the condition of extreme collapse. These desperate cases, where the vital forces are at a low ebb, require much judgment and discrimination as to when to operate in a particular case and as to just what to do at the operation—on the one hand, to stop the bleeding and thus prevent the patient from passing into an absolutely hopeless condition, and, on the other hand, to avoid snuffing out the little spark of life remaining by the added strain of intraperitoneal manipulations and anesthesia. The anesthesia and operative work must be reduced to a minimum, both in duration and extent. Some cases can be satisfactorily operated on under local anesthesia, and occasionally there is a case in which the patient's sensibilities are so obtunded that practically no anesthesia is necessary for the work required.

By the term "local anesthesia" I mean a true local anesthesia (as induced by cocaine or eucaine, or some similar preparation) and not general anesthesia by hypodermic injection. I would warn particularly against the use of scopolamin (hyoscin) in these cases where the depression is so marked. The induction of general anesthesia by hypodermic injection of this drug is not the simple and harmless procedure one might infer from the tenor of the flood of advertising literature which is being sent out by a certain interested commercial house. A number of deaths have been caused by the use of this drug, and it is especially dangerous in these serious conditions with marked depression. When necessary to give something to relieve pain or produce general anesthesia in the class of cases under consideration, it is better to use some reliable drug the effect of which is uniform and can be accurately gauged and depended upon—such as morphine hypodermatically or ether by inhalation.

5. **Pelvic Hematoma** (Fig. 668). If there are any evidences of active or recurring hemorrhage, the preferable treatment is abdominal section, with removal of the damaged tube and the blood-mass. If there is simply a quiescent blood-collection in the connective tissue, keep the patient quiet and watch. If the blood-mass is gradually absorbed, keep the patient quiet till the mass has largely disappeared, and then she may be allowed up and be counted practically well. If the mass remains stationary and symptoms of pronounced irritation persist or arise later, the patient should be subjected to operation—abdominal or vaginal, as indicated by the location of the mass and the accompanying symptoms.

6. **Advanced Cases.** These cases vary so much that it is impossible to give a rule applicable to all.

In some of them immediate operation is indicated, while in others it is advisable to wait for a time, either because the child has only recently died and the placenta and adhesions are still dangerously vascular, or, in rare cases, because there is good reason to hope for saving the child alive without unjustifiable risk to the mother (Fig. 669).

OTHER PELVIC DISORDERS.

Hemorrhage.

When there is hemorrhage into the pelvis from any cause, if the blood passes into the peritoneal cavity, it is known as "intraperitoneal hemorrhage." If the amount of blood is small and becomes shut in the pelvic cavity by a roof of exudate and adhesions above, it is referred to as a "pelvic hematocele." If the blood, instead of passing into the peritoneal cavity, passes into the connective tissue, the resulting condition is called "pelvic hematoma."

The usual cause of blood in the pelvis is extrauterine pregnancy, the characteristics of which have just been presented.

Hemorrhage into the pelvis occasionally occurs, however, from other **causes.** A collection of blood in the pelvis, either in the pelvic peritoneal cavity or in the connective tissue, may be caused by any one of the following conditions:

1. Rupture of a varicose vein of the broad ligament.
2. Hemorrhage from a Fallopian tube, due to inflammation or to a polypus, or some other tumor of the tube (page 796).
3. Hemorrhage from an ovary, due to acute congestion or inflammation, or to a papillary growth (page 818).
4. Rupture of one of the dilated vessels on a large tumor.
5. Hemorrhage from injury due to a blow or fall.
6. Hemorrhage from injury due to forcible reposition of an adherent uterus.

The **diagnosis** is made by the same symptoms that indicate hemorrhage in extrauterine pregnancy, but without the evidences of pregnancy.

As in the vast majority of cases of spontaneous pelvic hemorrhage the cause is extrauterine pregnancy, this affection must be excluded in any particular case before any other diagnosis is permissible. Sometimes this may be excluded by the circumstances of the case—for example, the patient may be a virgin, or may be past the menopause, or may have had no recent opportunity of becoming pregnant. In some cases the differential diagnosis can not be made until the operation, when one of the causes above mentioned may be apparent, with absence of indications of tubal pregnancy. In a doubtful case the diagnosis should be reserved until the suspicious mass, removed at operation, has been submitted to microscopic examination. In a tubal pregnancy, ruptured early and not operated on for several weeks, all naked eye evidence of the pregnancy may disappear. But by microscopic examination of the affected tube, evidence of the pregnancy may be found.

The **treatment** of pelvic hemorrhage not due to tubal pregnancy depends on the circumstances of the case. If the hemorrhage is into the connective tissue (hematoma) and well circumscribed, palliative treatment only is indicated. This consists of perfect quiet in the recumbent position, elevation of the foot of the bed and an ice-bag over the abdomen, and sedatives sufficient to give rest. In intraperitoneal hemorrhage of slight extent, where tubal pregnancy can be excluded, the same treatment is indicated. In either case the effused blood may be largely absorbed. If after a time it still remains and gives trouble or suppurates, the hematoma or hematocele, as the case may be, may be opened from the vagina, emptied and packed with gauze, the same as a pelvic abscess.

If there is serious intraperitoneal hemorrhage, it requires abdominal section if the patient is in fit condition, the additional steps in the intra-abdominal treatment depending upon the conditions found within the abdomen.

Fulminating Pelvic Edema.

Fulminating pelvic edema is the term applied to an intense and widespread edema of the pelvic interior, that comes on suddenly without apparent adequate cause. It is accompanied with serious symptoms and usually with extreme prostration. In fact, the sudden onset, the severity of the symptoms and the marked collapse suggest ruptured tubal pregnancy, and this mistaken diagnosis has been made in some of the cases. It is a rare condition and presents a puzzling problem in etiology and in diagnosis. Most of the cases have been associated with chronic inflammatory lesions in the pelvis, but why the sudden edema and serious symptoms should develop without apparent cause has not been satisfactorily explained. Clinically, however, the condition must be recognized and treated; hence its inclusion here.

The salient features in the **pathology, symptomatology** and **treatment** of this rare affection can best be presented by detailing some typical cases.

Fulminating Pelvic Edema.—Last year I was called in consultation by Dr. S. T. Bassett, of St. Louis, to see a patient with pelvic disturbance. It was Sunday; the patient had attended church in the morning feeling fairly well, but while there became very sick and could scarcely get home. She had a chill, followed by severe headache and general aching, but no localizing symptoms. There was no apparent local trouble in any part of the body to account for the fever, which rose to 105.5°. By evening there was evidence that the pelvis was the seat of the disturbance and I was asked to see the patient.

Examination.—I saw her about 10 p. m. The temperature had been reduced to 104°. The pulse was rapid, but of fair volume. The pelvis was filled with a tender mass which surrounded the uterus and fixed it firmly. There seemed to be acute pelvic inflammation with extensive exudate. But there was no apparent cause, either recent or remote. The patient had always been rather nervous and this had been somewhat worse of late, but there had been no symptoms indicating pelvic disease of any kind. The next day the temperature was 104.2°, pulse 120, respiration 28, and there was much peritoneal irritation. Operation at once was indicated, to check the rapidly progressing inflammation, if possible, and accordingly the patient was taken to the hospital.

Operation.—When the abdomen was opened the pelvis was found filled with small encysted collections of fluid involving the tubes, ovaries, broad ligament and uterus. The cysts or pseudocysts were of various sizes, were filled with clear serum and seemed to extend deeply into the substance of the organs involved. From the appearance I suspected hydatid disease. I removed all the cysts that it was feasible to remove and then drained the pelvis through the abdominal incision.

The temperature dropped within a few hours to 98°, and it did not again go high. During the first part of the period of convalescence it ranged from 99° to 100.2°, and later dropped to normal, where it remained. The wound and drainage tract healed rapidly and the patient had a smooth convalescence. Laboratory examination of the tissues removed showed no bacteria of any kind, no evidence of hydatid disease, and no specific pathologic process that would adequately account for the alarming symptoms and the marked tissue change.

Fulminating Pelvic Edema.—Reported by Briggs. A married woman, whose menstruation had been normal, came complaining of malaria and some pelvic pain. Pelvic examination showed nothing abnormal except a slight fullness about the left adnexa. Two days later the patient returned to the office, very sick. Her face was pale and pinched and anxious; pulse 120, small and weak; temperature, 100°. The pelvis was then completely filled with a fluctuating mass. The rapid development of the mass, with almost no fever, pointed to hemorrhage as the cause, and a diagnosis of tubal pregnancy was made. At the operation the pelvis was found filled with small cysts of various sizes, formed by collections of serum within the connective tissue. There was no tubal pregnancy. The pelvis was drained and the patient recovered.

Fulminating Pelvic Edema.—Reported by Briggs. Patient's menstruation was delayed four days, then came on scanty and was accompanied by paroxysmal pains, which caused the patient to think she was having a miscarriage. After some days the pain became more severe and the patient had two fainting spells. Temperature was normal, pulse 90 and small and compressible. The abdomen was sensitive. Sedatives were given, which diminished the pain, but the shock increased. The radial pulse became imperceptible and the skin and mucous membranes were markedly anemic. The uterus was enlarged, retroverted, fixed and sensitive, adnexa not felt. Liquid could be demonstrated in the flanks. Diagnosis, tubal pregnancy with rupture.

Operation.—The pelvis and lower abdomen were filled with great blebs due to the collection of serum in the connective tissue, causing the peritoneum to pouch into the pelvis from all directions. Both tubes were chronically inflamed and the right ovary was enlarged and cystic.

The patient's condition continued bad and she died some hours after the operation. The feature of the case was the enormous amount of serum pocketed in the connective tissue, without any evidence of recent inflammation.

Fulminating Pelvic Edema.—Reported by Legueu. Shortly after a normal menstruation, patient was suddently attacked with violent pelvic pain accompanied by syncope, extreme pallor and cold extremities. The abdomen was distended, hard and painful to pressure. Vaginal examination disclosed a fluctuating mass in the cul-de-sac. Diagnosis, retrouterine hematocele. On opening the abdomen a quantity of yellow serum escaped. There were large collections of serum in the tissues about the right adnexa, aggregating a pint. The patient recovered. Examination of the serum showed only leucocytes and peritoneal cells.

Fulminating Pelvic Edema.—Reported by Jocet. Patient, aged 28, married eight years, no children, had, on three separate occasions, an attack of severe abdominal pain accompanied by an accumulation of fluid in the right iliac fossa, which presented the characteristics of hematocele. Twice the mass terminated by resolution and the patient was perfectly well in the intervals. The third time, after the usual symptoms of the supposed hematocele had continued some weeks with improvement, the patient was suddenly seized with violent abdominal pain, accompanied by pallor, anxious facies and incessant vomiting. The mass enlarged and there developed features that pointed to inflammation rather than hemorrhage as the cause of the trouble. Operation showed the pelvis filled with encysted collections of serum, and finally, deep in the pelvis, there was found an old ovarian abscess, which was evidently the exciting cause of the surrounding edema.

Tumors of Fallopian Tubes.

Primary tumors of the Fallopian tubes are very rare. Fibromyoma, carcinoma, and sarcoma may occur here, and they present the same structure and tendencies as elsewhere.

If arising from the interstitial portion of the tube, they produce the symptoms of similar tumors of the uterus. If arising from the outer portion of the tube, they correspond in position to tumors of the ovary.

It is interesting to note that chorio-epithelioma has been found in a tube following tubal pregnancy.

The diagnosis of tumors of the tube is usually made after the abdomen is opened. They present no definite distinguishing characteristics, and when felt in examination are usually taken for growths arising from those structures in which tumors more frequently occur—namely, the uterus, the ovary or the broad ligament.

The treatment of tumors of the tube is the same as for like growths in other pelvic organs.

Varicose Veins of Broad Ligament.

Occasionally the veins of the broad ligament are found markedly dilated, and in the dilated veins are sometimes found thrombi and even small stones (phleboliths).

The principal etiologic factors which have been mentioned are subinvolution of the broad ligaments following pregnancy, relaxation of the tissues from poor general health, and obstruction of the venous circulation of the broad ligament by tumors, or by heart disease, or by loaded bowel, or by uterine displacement.

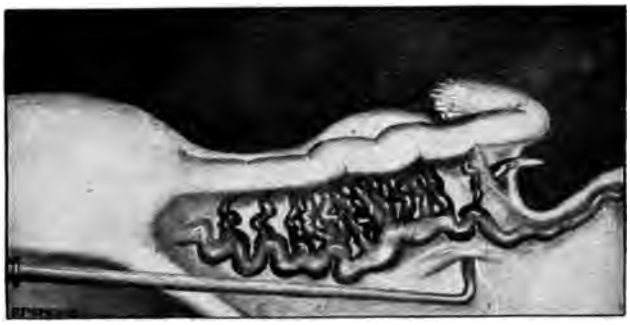

Fig. 670. Ligating Varicose Veins in the Broad Ligament. (Reed—*Text-book of Gynecology.*)

The symptoms (weight and pressure when upright and relieved by the recumbent posture) are not distinctive—in fact, the condition is usually overshadowed by more evident lesions. In most cases so far reported this condition was thought of only after the abdomen was open and the enlarged veins apparent.

In cases of persistent pelvic pain without palpable lesion, this condition should be thought of, and if the symptoms are severe in spite of palliative measures it may be advisable to make an exploratory abdominal section, with the idea of correcting this condition if found.

When phleboliths or thrombi (Fig. 406) are present, they may in exceptional cases form masses that can be felt on bimanual palpation.

The treatment is abdominal section and ligation of the enlarged veins at short intervals, as advocated by Reed (Fig. 670), and free incision and evacuation of the ligated portions.

Echinococcus Disease of Pelvis.

Echinococcus disease is occasionally found in the pelvis. For a description of this affection see echinococcus disease of the uterus (page 593). When it affects other pelvic structures, it is supposed in most cases to come from the rectum by way of the perirectal connective tissue.

Pseudo-tuberculosis of Peritoneum.

This is a rare condition, in which the pelvic peritoneum is studded with small opaque, thickened spots, presenting the superficial appearance of peritoneal tuberculosis. Microscopic examination of the involved tissue, however, shows no tuberculosis, but simply chronic inflammatory infiltration.

CHAPTER XII.

TUMORS OF THE OVARY AND PAROVARIUM.

Before taking up the tumors of the ovary and parovarium I wish to call attention to certain points in the anatomy and physiology of the structures involved.

POINTS IN ANATOMY AND PHYSIOLOGY.

THE OVARY.

The ovaries are situated one on either side of the uterus near the pelvic brim and close to the outer end of the Fallopian tube (Fig. 3, 4). Each ovary projects from the posterior wall of the broad ligament of its respective side and the peritoneal fold thus formed is called the "mesovarium" (Fig 671).

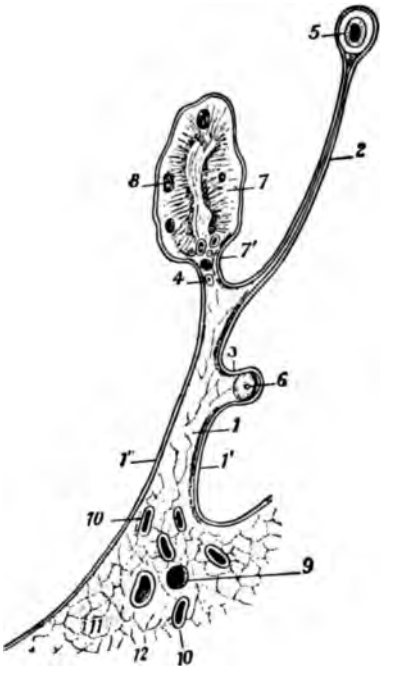

Fig. 671. Vertical Section through the Broad Ligament, showing the Relation of the Ovary to the same. 5, Fallopian tube. 6, Round ligament. 7, Ovary. 7', Mesovarium, connecting the ovary with the broad ligament. (Jewett, from Testut—*ractice of Obstetrics.*)

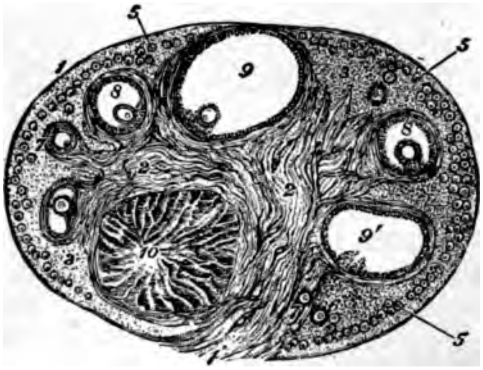

Fig. 672. Section of the Ovary of a Cat. 1, Peritoneal surface of the ovary. 1, Hilum. 2, Medullary portion of ovary. 3, Cortical portion. 5, Small Graafian follicles. 7, 8, 9, Maturing Graafian follicles. 10, Corpus luteum. (Jewett, after Schoen—*Practice of Obstetrics.*)

It is through this attachment to the broad ligament that the ovary receives its blood supply, this being the point where the vessels enter.

The shape of the ovary is much like that of an almond. In size the ovaries vary much in different individuals, and even in the same individual the two ovaries may differ in size. Ordinarily the ovary is 1½ to 2 inches in length, about 1 inch in width, and about ½ inch in thickness. It weighs 75 to 150 grains.

Structure. In structure the ovary is simply a bunch of ova, or microscopic eggs, supported and held together by the connective tissue which forms the frame-work. Each ovum is contained within a minute sac, called the ovisac or **Graafian follicle** (Fig. 672). The connective extends between the follicles in all directions, and, in addition to supporting and protecting them, it carries the blood vessels that nourish them and also the lymph vessels and nerves. This connective tissue constitutes the **ovarian stroma** and is peculiar in that it is exceedingly rich in cells. These are spindle-shaped connective tissue cells, and they are packed so closely together that in an ordinary microscopic preparation the tissue seems to be made up exclusively of long, oval nuclei lying close together (Fig. 673). Near the periphery of the ovary

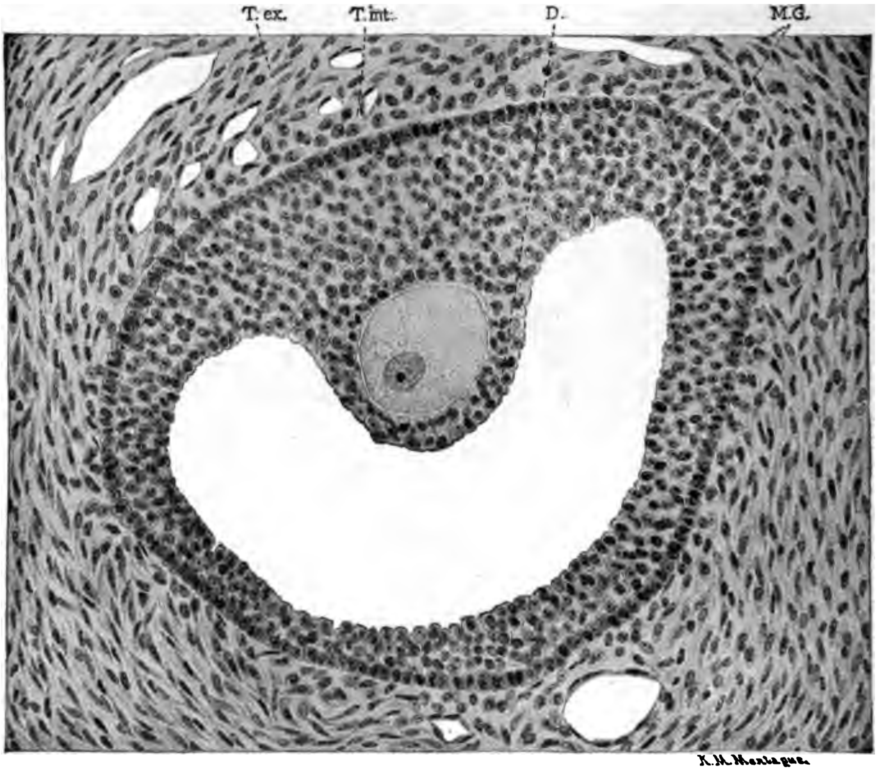

Fig. 673. A Graafian Follicle with its Contained Ovum, highly magnified. M. G., membrana granulosa. The ovarian stroma is also well shown. (Williams—*Obstetrics*.)

the connective tissue fibers become more numerous and the nuclei fewer, so that there is here a rather dense capsule. This fibrous capsule of the ovary is known as the "tunica albuginea." It is simply a condensation of the ovarian stroma and serves to protect the deeper structures of the ovary. Outside of this fibrous layer lies the epithelial covering.

That portion of the ovary at which the vessels find entrance and exit is called the **hilum** (Fig. 672). Immediately about the hilum, and extending some little distance into the ovary, is the area known as the medulla or **medullary portion.** This is occupied by the blood vessels, lymph vessels, the nerves and supporting connective tissue. It contains no follicles.

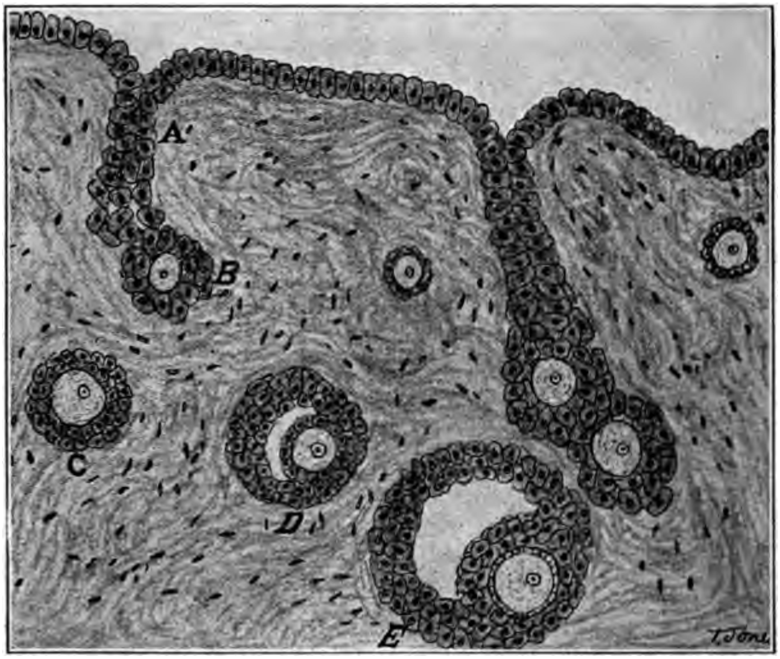

Fig. 674. Development of the Ovary (after Wiedersheim). A, an ingrowth of the germinal epithelium, forming a cell-cord, which breaks up into primitive Graafian follicles; B, a primitive Graafian follicle, with its contained primitive ovum; C, D, E, later stages in the development of the Graafian follicle.

The remaining part of the ovary contains the Graafian follicles, and is called the cortex or **cortical portion** (Fig. 672). The free surface of the cortical portion—that is, the peritoneal surface of the ovary—is covered with cylindrical epithelium, the remains of the germinal epithelium, from which the ova and Graafian follicles were formed by infoldings (Fig. 674).

The Graafian follicles are very numerous and of different sizes. The small young follicles lie near the surface and number thousands. They are about 1/100 of an inch in diameter. The larger, older follicles lie deeper and are not so numerous. The largest of these measure 1/25 of an inch in diameter.

The Graafian follicle is lined with an epithelial layer several cells thick, called the "membrana granulosa," and is filled with clear viscid fluid, the "liquor folliculi." The ovum lies within the follicle near one side and is completely surrounded by cells of the membrana granulosa (Fig. 673).

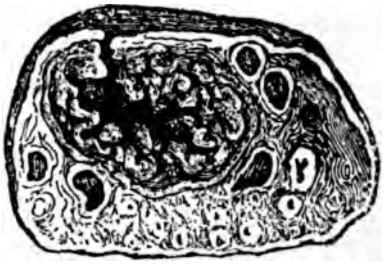

Fig. 675. A Corpus Luteum, fifteen days from the beginning of menstruation. (Baldy—*American Text-book of Gynecology.*)

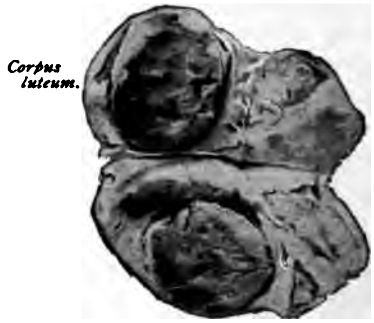

Fig. 676. Ovary of a Virgin, showing an unusually large corpus luteum. Notice what a large part of the ovary the corpus luteum occupies. (Piersol, after Hirst—*American Text-book of Obstetrics.*)

As the Graafian follicle matures, it again approaches the surface and becomes still larger. It gradually protrudes at the free surface of the ovary and when ripe it bursts, liberating the ovum on the surface of the ovary, from where it finds its way into the Fallopian tube. This ripening and bursting of

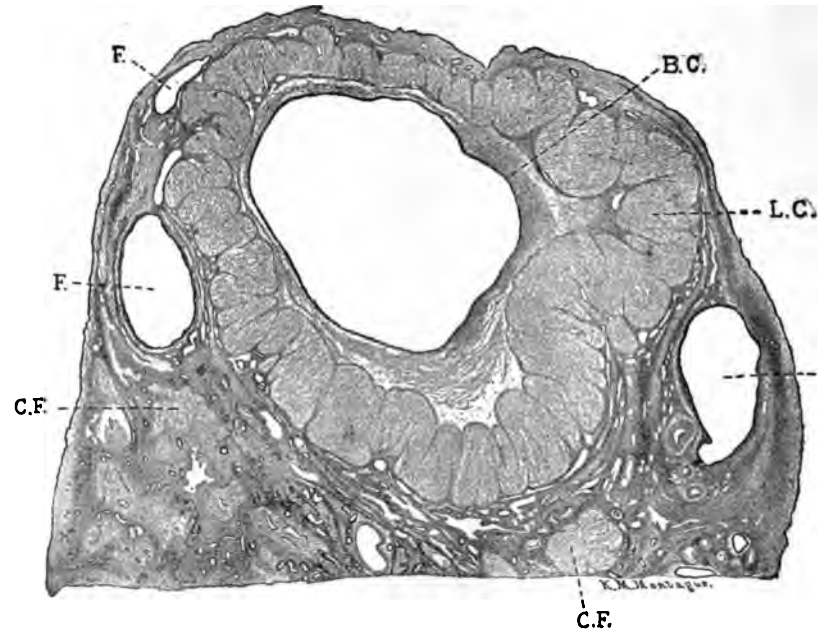

Fig. 677. Section of a Corpus Luteum, showing the wavy line composed of lutein cells. (Williams—*Obstetrics.*)

the Graafian follicle and liberation of the contained ovum is called "ovulation," and is usually coincident with menstruation.

After the ripened ovum is discharged, the ruptured follicle fills with bloody serum, which clots. The rent in the follicular wall soon heals and the blood clot becomes partially decolorized. This follicle, filled with blood clot, is very prominent (Figs. 675, 676) and when encountered during the course of an operation has been mistaken for hematoma of the ovary, though it is simply a recently ruptured follicle and consequently a normal structure.

In a few days there appear certain peculiar cells containing pigment. These cells are large, resembling decidua cells. They are formed first about the periphery of the fibrinous mass, but they gradually increase in number and advance toward the center, until finally they fill nearly the whole interior of the broken follicle (Figs. 677, 678). The pigment in the cells is yellow; consequently they are called "lutein" cells, and the mass formed by them is of course also yellow and hence is called the **corpus luteum** (yellow body). A section of a corpus luteum shows a wavy yellow outer portion formed by the lutein cells (Fig. 676). The source of these lutein cells is still in dispute. Some authorities hold that they are derived from the remnants of the membrana granulosa, while others state that they are derived from the connective tissue cells of the "theca interna" (the internal layer of the fibrous capsule of the Graafian follicle).

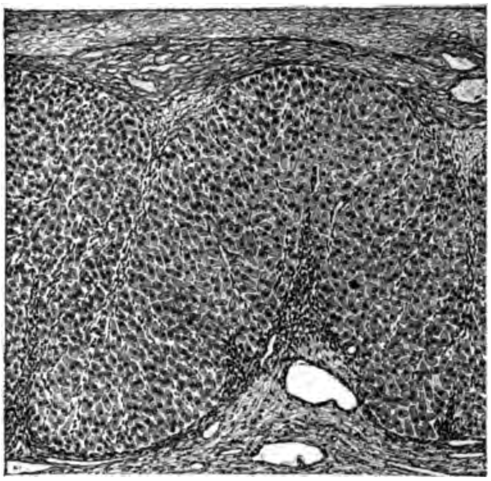

Fig. 678. The Wavy Line in the Wall of the Corpus Luteum, highly magnified to show the lutein cells. (Williams—*Obstetrics.*)

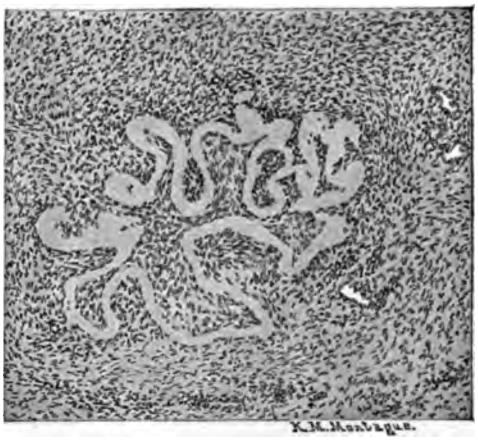

Fig. 679. The Corpus Albicans. After the ruptured follicle has passed through the various stages of the corpus luteum, there remains simply a wavy line of fibrous tissue, representing the final stage of the ruptured follicle. The retraction of this scar-tissue causes depressions, as shown in Fig. 680. (Williams—*Obstetrics.*)

The lutein cells gradually disappear and after a time the area of the ruptured follicle is occupied only by scar tissue (Fig. 679). The area is then no longer yellow, but white, and consequently is called the **corpus albicans** (white body). The corpus albicans, consisting of scar tissue, represents the final stage of the ruptured follicle. After many follicles have ruptured, the surface of the ovary often becomes very uneven on account of the number of these depressed scars (Fig. 680).

Ordinarily the corpus luteum passes through the changes described in a short time. If, however, pregnancy follows ovulation, the corpus lutem of that ovulation grows very large and remains for months before retrograde changes set in.

Ligaments. The ovary lies in the pelvis obliquely and its inner end is about one inch from the uterus. Extending from this end of the ovary to the uterus is a small fibro-muscular cord, the "utero-ovarian ligament," which joins the uterus just below the Fallopian tube (Fig. 4). The suspensory ligament of the ovary, the "ligamentum suspensorium ovarii," is the thickened edge of the broad ligament connecting the ovary and tube with the side of the pelvis. The "infundibulo-ovarian ligament" extends from the ovary to the outer end of the Fallopian tube.

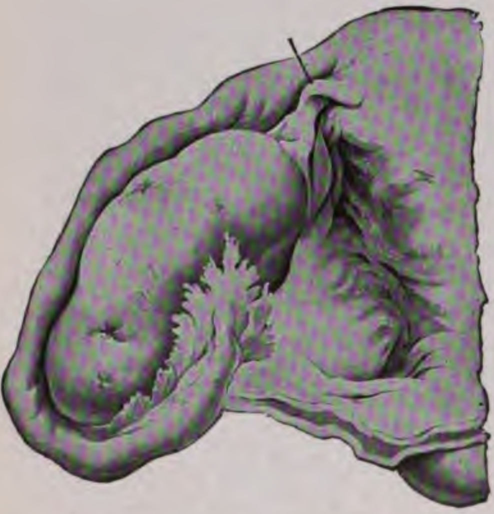

Fig. 680. The Ovary of a Woman Twenty-three Years of Age. Notice the depressed scars, resulting from ruptured follicles. (Piersol, after Sutton—*American Text-book of Obstetrics.*)

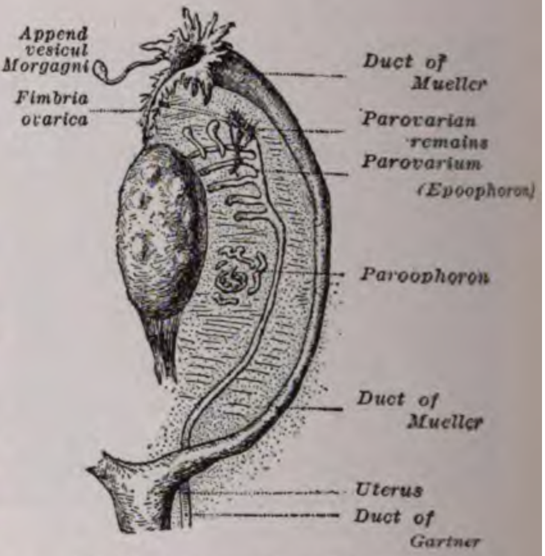

Fig. 681. Embryonic Genital Organs, showing the parovarium and paroophoron, and their relation to the tube and ovary and duct of Gärtner. (Abel, after Kollmann—*Gynecological Pathology.*)

Vessels and Nerves. The ovary is supplied with blood by several branches of the ovarian artery, which corresponds to the spermatic artery in the male. The ovarian artery arises directly from the abdominal aorta and, passing downward to the side of the pelvis, enters the broad ligament and sends branches to the ovary and uterus and tube. The veins correspond to the artery and form a plexus near the hilum, which is known as the pampiniform plexus, sometimes called the ovarian plexus.

The lymphatic spaces surround the Graafian follicles and ramify throughout the connective tissue of the ovary. They pass out at the hilum and anastomose with the uterine lymphatics in the broad ligament and empty into the lumber glands.

The nerves come from the renal and spermatic ganglia. The fibers pass along in the connective tissue framework to all the Graafian follicles and terminate in the follicular epithelium.

Physiology of the Ovary.

The principal function of the ovary is the **formation of ova** and the preparation of the same for impregnation. The ova are developed from primitive ova derived from the "germinal epithelium" of the embryo. In the formation of the ovary in the growing embryo, portions of the germinal epithelium are included within the organ, and from these included cells the ova and Graafian follicles are developed (Fig. 674). A remnant of the primary germ-epithelium remains, as the layer of cylindrical epithelium covering the peritoneal surface of the ovary. In the preparation of ova, nature displays a lavish hand. It is estimated that each ovary at the age of eighteen years contains 36,000 ova, but not more than 200 of these reach maturity.

The **ovum**, which is the most important structure in the ovary, is a single cell composed of four parts, as follows:

a. A thick surrounding substance or membrane called the "zona radiata" or zona pellucida.
b. The cell substance or protoplasm, the inner portion of which is known as the "vitellus."
c. The nucleus or "germinal vesicle."
d. The nucleolus or "germinal spot."

The ovum is spherical, and when fully developed measures 1-120 of an inch in diameter. Just before the ovum is discharged upon the surface of the ovary by the bursting of the follicle, as previously described, it goes through a process of ripening. This process is called "maturation" and consists in the karyokinetic division of the nucleus and the expulsion of a small portion of it. This occurs twice in succession. The cast off portions have been named "polar bodies." The polar bodies are apparently of no further use, as they soon disappear. It may be remarked here that certain tumors (teratomata) are supposed to originate from these polar bodies. The remains of the nucleus wanders to near the center of the cell and the ovum assumes a resting state. It is then ready for impregnation. It is carried into the Fallopian tube, and, if impregnation does not take place, passes into the uterus and out of that organ into the vagina and is lost.

In recent years it has come to be recognized that the ovary has another function, entirely distinct from ovulation. This is known as the **trophic function** or nutritional function of the ovary. By clinical observations and by experiments on animals the following facts have been established.

1. That the ovary controls menstruation. When the ovaries are removed menstruation soon ceases. The ovary furnishes the "menstrual impulse," though the menstrual blood itself comes from the uterus.

2. That the ovary controls the development of the uterus and of the breasts. When the ovaries of newly-born guinea pigs were removed, the breasts and the uterus and even the external genitals failed to develop. When one ovary was left, the normal development took place the same as though both ovaries were present. Similar experiments on rabbits and on dogs gave similar results—i. e., the removal of both ovaries in the young prevented proper development of the uterus and the breasts.

3. That the ovary controls to a considerable extent the nutrition of the uterus, even in the adult. Numerous experiments in rabbits and dogs and cows have shown that after the removal of both ovaries the uterus slowly atrophies and develops the characteristics of senility. Clinical experience and pathological investigation have shown that the same results slowly take place in women after the removal of both ovaries.

4. That the ovary exercises a decided influence on the nervous system. In nearly every case after the complete removal of the ovaries there appear certain nervous disturbances. These are practically the same as are found accompanying the natural menopause—hot flashes, fleeting emotional disturbances and other evidences of an unstable or irritable nervous system. These occur so regularly after double oophorectomy that we expect them. and give to the symptom group the name "artificial menopause" or induced menopause. These symptoms usually subside after one or two or three years, as in the natural menopause. Occasionally, however, they persist and increase and become serious. If one ovary be left, or even part of an ovary that continues to functionate, these symptoms do not appear, showing that the ovary exercises the controlling influence. If still stronger proof of this fact be desired, it is found in this: In patients suffering with these troublesome symptoms following removal of both ovaries, healthy ovaries have been transplanted, with the result that the symptoms under consideration entirely disappeared.

Now comes the question, how does the ovary exercise this marked trophic influence, evidenced (1) by controlling menstruation, (2) by controlling the development of the uterus and breasts, (3) by controlling the nutrition of the uterus and (4) by controlling certain nervous disturbances? It was for a long time supposed that the influence was reflex, by way of the nerves in the ovary. But it is now pretty well established that it is not by the nerves, but by some substance which is manufactured in the ovary and thrown into the circulating blood. This action is designated by the term "internal secretion." It is analogous to the function of the thyroid gland, which, though it possesses no duct, manufactures a principle which finds its way into the circulation and exercises a marked influence over the general nutrition, as evidenced by the fact that when the thyroid gland is destroyed by disease or operation, there results that very serious condition known as myxodema.

That the powerful trophic influence of the ovary is due to an internal secretion into the circulation, and not to reflexes through the ovarian nerves, is indicated by the fact that if the ovaries be removed—i. e., entirely severed from their nervous connections, and transplanted to another part of the body—they still exercise the same influence. This has been demonstrated over and over again by various authorities. In guinea pigs the ovaries were removed from the pelvis and transplanted under the skin, with the result that the uterus and breasts developed normally. As the ovaries had been entirely severed from the pelvic nerves, the only probable way for them to influence the uterus and breasts was through the circulation. In rabbits and dogs transplantation of the ovaries in various parts of the body have given similar results.

In the human patient transplantation of an ovary from one patient to another has been successfully carried out a few times and with decidedly beneficial results. I have not space to go further into the interesting experiments along this line. Enough has been said to show that the ovary has two important functions, (1) the formation of the ova suitable for impregnation and (2) the nutritional effect (probably due to the internal secretion into the circulation of some substance), by which is exercised a controlling influence on menstruation, on the development of the uterus and breasts, and on certain nervous disturbances.

Based on the latter function of the ovary are certain **therapeutic measures** which have come into prominence in the last few years. They are as follows:

1. **Leaving Part of an Ovary.** In the operative treatment of ovarian diseases, an ovary or part of an ovary is always preserved in place if the pathological condition will permit.

2. **Administration of Ovarian Tissue.** In a patient in whom both ovaries must be sacrificed, the patient is afterwards given desiccated ovarian tissue for the purpose of lessening the disturbances of the artificial menopause.

3. **Transplantation of an Ovary.** In a patient presenting serious symptoms as the result of the removal of both ovaries by operation or their destruction by disease, a healthy ovary from another person is transplanted to the pelvis of the chronic invalid to supply again the ovarian trophic substance.

This has been carried out successfully in several instances. In one patient the transplantation operation was made two years after both ovaries had been removed. The patient was restored to health and there was also partial restoration of the menses. Still better results have followed the immediate transplantation of a healthy ovary during the primary operation in which both ovaries were so diseased that they had to be removed. In at least one case the menstruation continued regularly as though the ovaries had not been disturbed. This work is still in the experimental stage, but enough has already been accomplished to show that a healthy ovary, successfully transplanted, can continue its functions and, consequently, that many women can be rescued from the condition of chronic invalidism caused by destruction of the ovaries or by imperfect development of the same.

Investigations concerning the **trophic influence** of the ovary indicates that that influence comes **from the corpus luteum.** In fact it appears that the corpus luteum is a temporary secreting gland, the lutein cells being the active secreting cells. In support of the theory that it is the secretion of the lutein cells that controls menstruation and exercises the general trophic influence due to the ovary, the following facts have been cited:

a. In the transplantation experiments previously mentioned, if the transplanted ovary did not survive in such condition that ovulation took place—i. e., an ovum was discharged and a corpus luteum formed—no trophic influence was apparent. It was just as though no ovarian tissue were present.

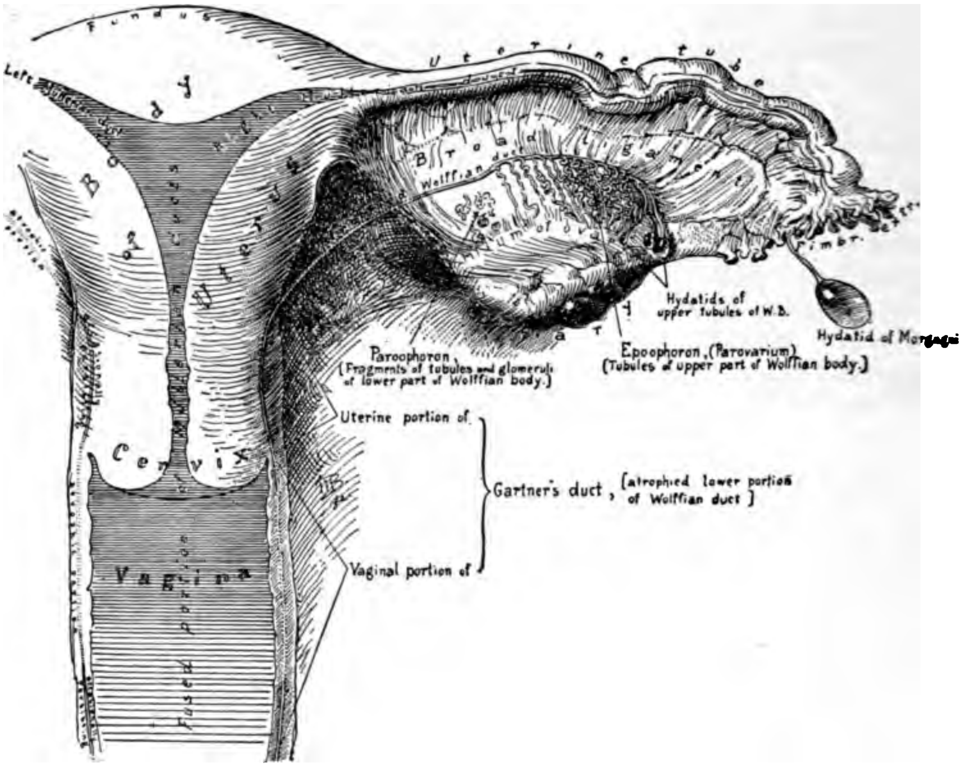
Fundus
Left
Uterine tube
Fimbr.
Cervix
Vagina
Paroophoron, (Fragments of tubules and glomeruli of lower part of Wolffian body.)
Epoophoron, (Parovarium) (Tubules of upper part of Wolffian body.)
Hydatids of upper tubules of W. B.
Hydatid of Morgagni
Uterine portion of
Gartner's duct, (atrophied lower portion of Wolffian duct)
Vaginal portion of

Fig. 682. Adult Genital Organs, showing parovarium, Gärtner's duct and various other structures. (Kelly after Cullen—*Operative Gynecology.*)

b. Destruction of the corpus luteum in rabbits in the early part of pregnancy prevented complete development of the pregnant uterus and contained ovum. The effect was the same, whether the entire ovary was removed or simply the corpus luteum destroyed.

c. Destruction of the corpus luteum in the non-pregnant caused the next menstruation to be missed, indicating that the secretion of the lutein cells of the corpus luteum of each period prepared the uterus for the menstruation of the next period.

This destruction of the fresh corpus luteum was carried out in a series of nine women, who were being operated on for malposition or similar troubles that did not interfere with the observations. In eight of the nine cases the next menstruation was missed, the succeeding menstruations, however, occurring regularly.

d. In that class of cases in which the administration of desiccated ovarian tissue produces beneficial results, the administration of lutein tissue produced similar and even better results, indicating that the active principle of ovarian tissue is contained in the lutein cells.

THE PAROVARIUM.

The parovarium is the remains of a fetal organ, the Wolffian body, which helps to form the generative organs. It consists of a triangular group of tubules situated in that part of the broad ligament lying between the ovary and the Fallopian tube. The apex of the triangle lies near the hilum of the ovary. Beginning near the hilum of the ovary, the tubules extend upward, almost parallel, or in a kind of fan-shaped formation, and enter a transverse tube. This transverse tube is called the "head tube" and it terminates in a small cul-de-sac near the fimbriated extremity of the Fallopian tube (Figs. 681, 682). Very often this little cul-de-sac becomes distended with fluid and forms a miniature cyst on the surface of the broad ligament. But the little cyst thus formed is apparently distinct from another miniature cyst usually found in the same vicinity and called the "hydatid of Morgagni." The hydatid of Morgagni is the dilated end of another fetal structure—the duct of Müller, which forms the Fallopian tube.

Another smaller group of remnants of the Wolffian body which lies nearer the uterus is called the "paroophoron" (Figs. 681, 682).

The tubules of the parovarium and paroophoron are embedded in the delicate connective tissue between the layers of the broad ligament and have no connection with any of the surrounding organs.

The structure has no function, and it is of interest chiefly because it gives rise to certain tumors of the broad ligament.

CLASSIFICATION

of Tumors of the Ovary.

It will be noticed that I have included in this table, under simple cysts, some conditions that are not really tumors (new growths), but only inflammatory and nutritial changes. Clinically, however, they resemble so closely certain new growths that I think best to consider them here. Keeping in mind this explanation, and also the fact that this is a **clinical and not a pathological classification, there should be no confusion.**

Ovarian Tumors.

- **Cystic Tumors** (95%).
  - Simple Cysts.
    - Follicular Cysts.
    - Cysts of Corpus Luteum.
    - Tubo-ovarian Cysts.
  - Proliferating Cysts (Cystadenomata).
    - Pseudomucinous Cysts (Cystadenoma Evertens).
    - Serous Cysts (Cystadenoma Invertens).
  - Dermoid Cysts.
- **Solid Tumors** (5%).
    - Fibromata.
    - Fibromyomata.
    - Papillomata (of surface).
    - Carcinomata.
    - Sarcomata.

CYSTIC TUMORS OF THE OVARY.

These comprise simple cysts, proliferating cysts and dermoid cysts.

DEFINITION AND PATHOLOGY.

Simple Cysts.

Under this term is included follicular cyst, corpus luteum cysts, and tubo-ovarian cysts.

Follicular cysts (Figs. 656, 683) are simply unruptured Graafian follicles which have become dilated. The increase in the fluid of the follicle and the consequent formation of a small cyst is due to the failure of the follicle to rupture. This failure to rupture may be caused by the deep situation of the follicle or by thickening of the tunica albuginea (the fibrous coat of the ovary), or by the peritoneal exudate on the surface of the ovary.

These follicular cysts are small and rarely produce serious symptoms. They are frequently found in chronic oophoritis, and an ovary may contain fifteen or twenty of them and still not be more than twice its normal size. Such a condition is designated by the term "hydrops folliculi" and also by the term "cystic ovary." Such a condition is not an indication for operation, unless there are serious complications or unusually severe symptoms. Occasionally a follicular cyst will enlarge to the size of the fist (Fig. 420), but that is rare.

It was formerly supposed that the large proliferating cysts of the ovary were derived from these small follicular cysts, but that theory has been abandoned.

Corpus luteum cysts (Fig. 684) are, as their name indicates, derived from corpora lutea, which, instead of undergoing the regular process of absorption and cicatrization, undergo a cystic change. Microscopic examination of the walls of such a cyst will show the lutein cells, characteristic of the corpus luteum (Fig. 685). Corpus luteum cysts are usually not larger than an egg, though a few larger ones have been reported.

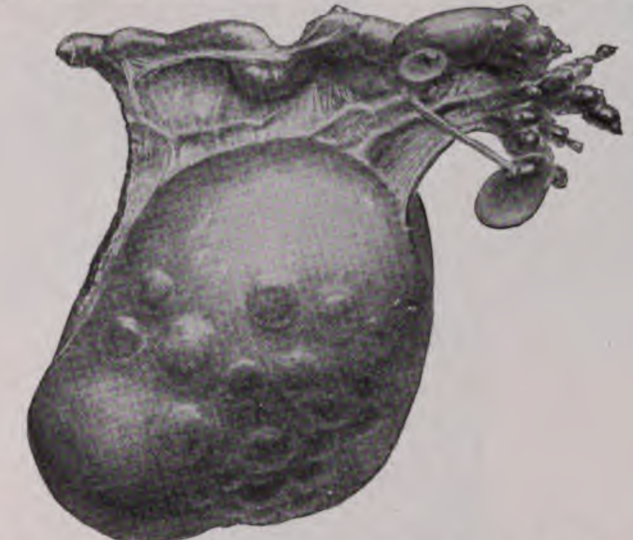

Fig. 683. Follicular Cysts of the Ovary. (Kelly—*Operative Gynecology.*)

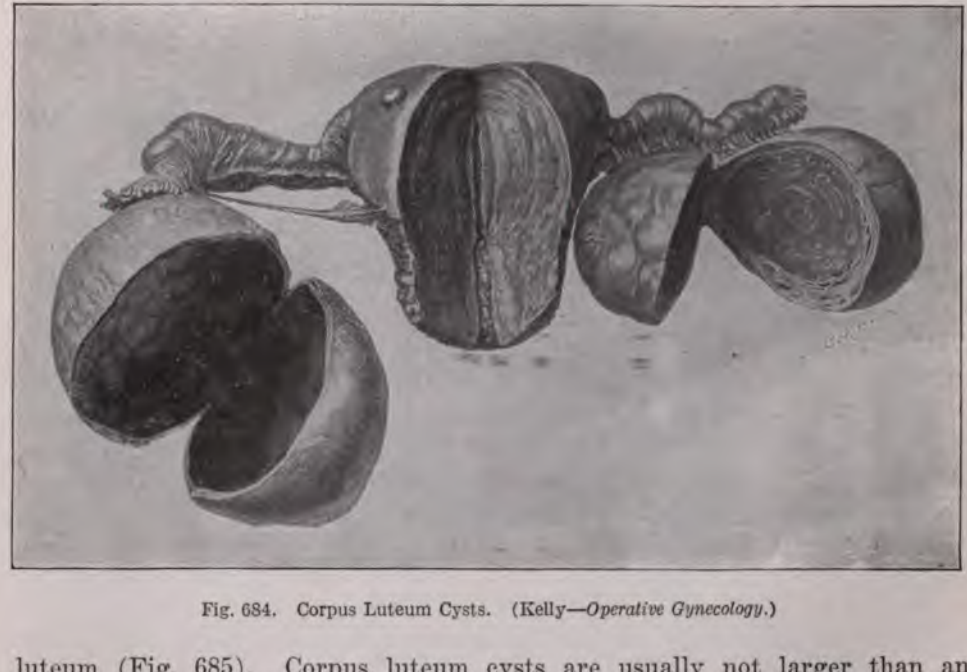

Fig. 684. Corpus Luteum Cysts. (Kelly—*Operative Gynecology.*)

Tubo-ovarian cysts are those cysts, usually small, which are formed by the tube and the ovary combined (Fig. 686). A simple cyst of the ovary may rupture into an adherent tube, or a dilated tube containing fluid (hydrosalpinx) may become adherent to an ovary and rupture into it. In either case the wall of the resulting cavity is formed by both the tube and ovary; hence the name "tubo-ovarian." These cysts are usually small.

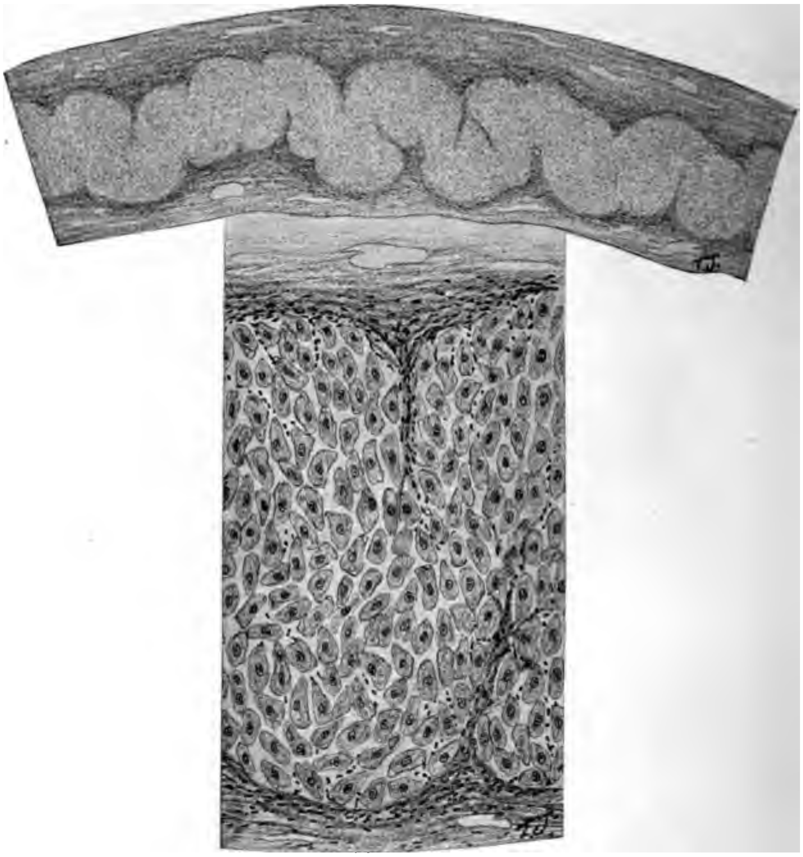

Fig. 685. Layer of Lutein Cells, which is the distinguishing element in the wall of a corpus lutein cys The upper part of the drawing indicates the appearance of the corrugated yellow layer in the cyst wall, while the lower portion represents a high magnification, showing the individual lutein cells.

None of the conditions described under simple cysts require operation, unless the symptoms are very troublesome and persistent. If the condiiton is discovered in the course of an abdominal section for some other trouble, the pathological structure should ordinarily be removed, with the sacrifice of as little normal tissue as possible.

Proliferating Cysts.

These are the ovarian tumors which attain such a large size (Fig. 687). This is the form of growth ordinarily referred to when an "ovarian cyst" or "ovarian tumor" is spoken of.

The term "proliferating" is given to these growths because they have the faculty of generating new cysts within the original cyst or on the outside of it. They increase in size persistently and there is no means of stopping their growth, except removal.

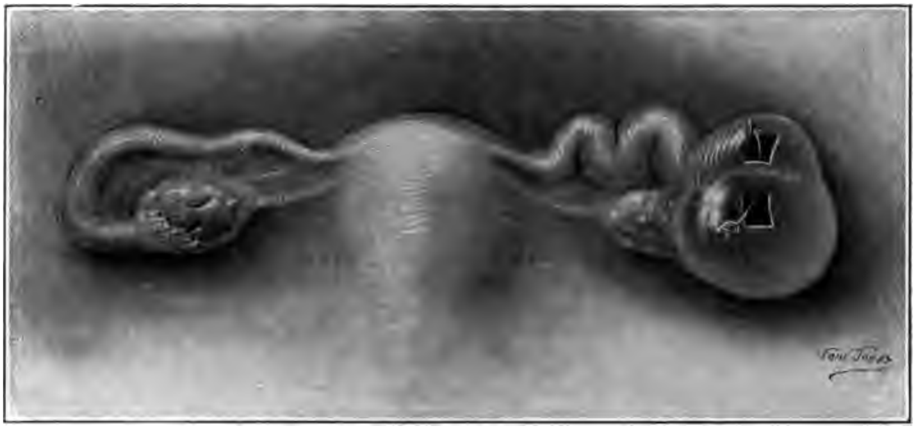

Fig. 686. A Tubo-ovarian Cyst. The arrow, passing in one window and out of the other, indicates the communication between the ovarian and the tubal portion of the cystic mass.

The proliferating cysts, or cystadenomata, are of two kinds—the pseudomucinous and the serous.

Pseudomucinous Cystadenomata. These are known also as "paramucinous cystadenomata" and as "cystadenomata evertens." In these cysts the

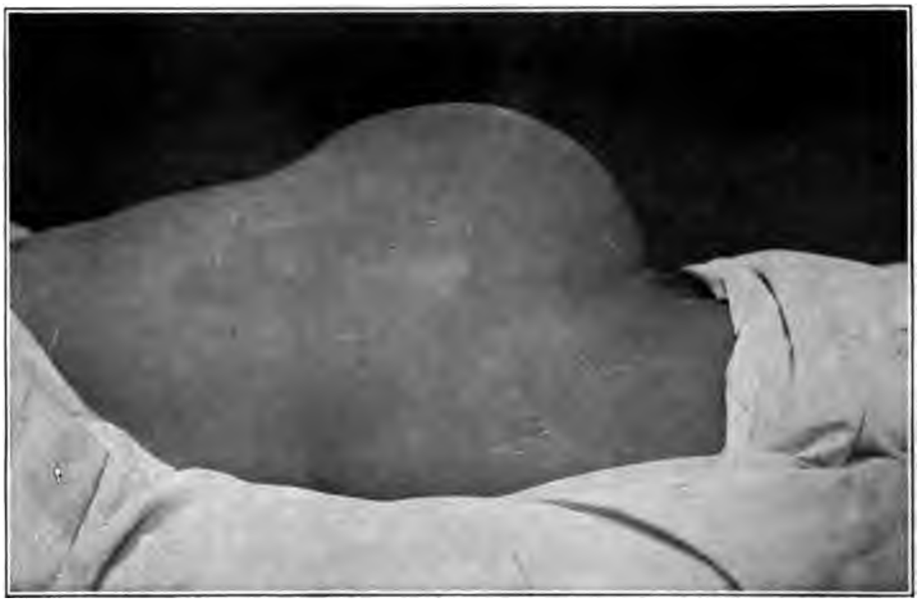

Fig. 687 Patient with a Large Ovarian Tumor.

contents consist of a jelly-like material which is secreted by the epithelial cells lining the cyst. This gelatinous material is the distinguishing characteristic of the pseudomucinous cyst (Fig. 688). On chemical examination it shows the reaction for paramucin or pseudomucin (not precipitated by acetic acid, but precipitated by alcohol as delicate threads, which are insoluble in water; mucin is precipitated by acetic acid, and albumen is precipitated by heat). The color of this gelatinous material depends on the amount of blood-coloring which has diffused through it from hemorrhage into the cyst, as explained later.

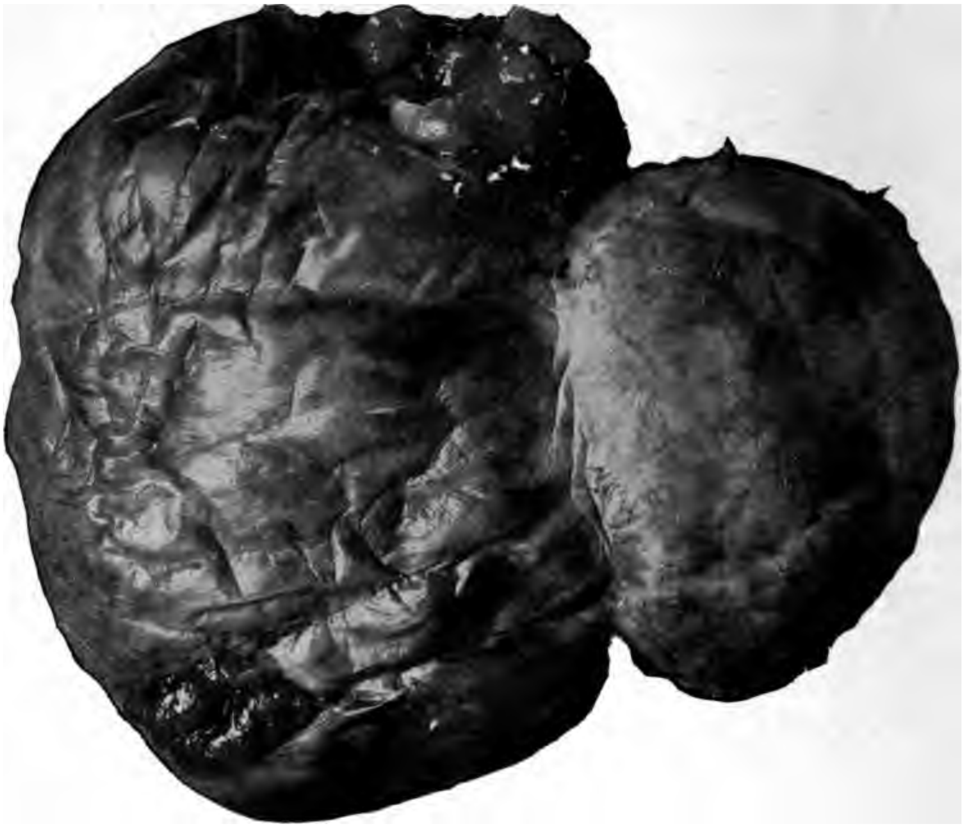

Fig. 688. A Large Pseudomucinous Cystadenoma of the Ovary. In this case the contents were semi-solid like jelly, and would not flow through the largest tube. The cyst wall was so friable that it would not stand the manipulations necessary to scooping out the cyst contents, so it was necessary to remove the cyst like a solid tumor through a very long incision. The gelatinous material within the cyst may be seen protruding through a rent in the wall at the lower part and also at the upper part.

As the contents are formed by the secretion of the cells lining the cyst, there is a constant increase in the amount, and this causes constant internal pressure, which keeps the wall of the cyst tense. In this way the epithelial layer is kept spread out and does not so much tend to pile up along the wall as papillary projections. Rather the pressure tends to depress portions of the wall, and as the epithelial cells multiply they are pushed further out in the wall in the form of gland-like depressions—hence the name "evertens." The depressions may become occluded at the neck and are thus cut off from the main cavity, forming secondary cysts (Fig. 689). These secondary cysts are found in great numbers about the primary cyst and occasionally one or more of the secondary cysts may become as large as the primary one.

The rule that pseudomucinous cysts are evertent is not absolute. In nearly all such cysts there are a few insignificant epithelial ingrowths, and in rare cases these growths may predominate, giving a distinct character to the growth (pseudomucinous cystadenoma invertens. Such atypical pseudomucinous cysts are nearly always small, indicating that there was not much internal pressure.

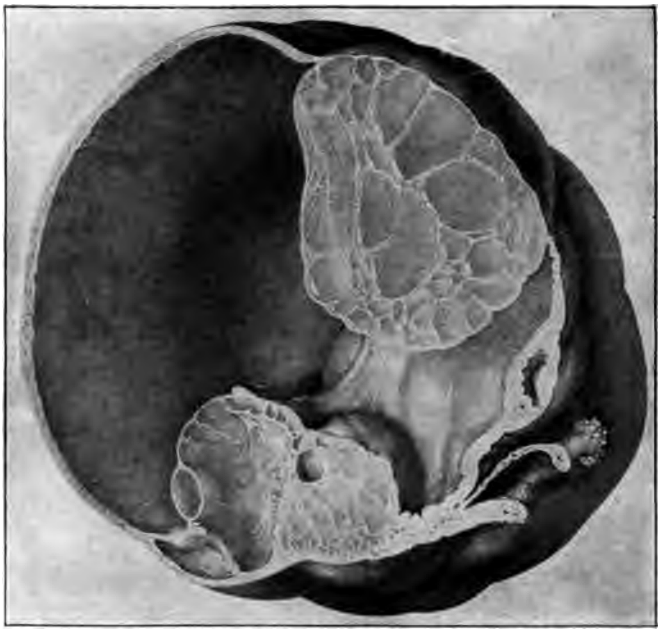

Fig. 689. A Pseudomucinous Cystadenoma of the Ovary. Notice the development of secondary cysts in the wall of the large cyst. (Kelly—*Operative Gynecology.*)

The cells lining the pseudomucinous cyst present, on microscopic examination, the following characteristics:

They contain pseudomucin. This is contained in the inner end of the cell (the end next to the cyst cavity)—hence this end of each cell remains clear, because the pseudomucin does not take the ordinary stain used in the preparation of microscopic specimens (Fig. 690, a).

There are goblet cells scattered here and there among the columnar cells.

The cells are not ciliated.

The pseudomucinous cystadenomata are nearly always confined to the ovary of one side, being bilateral only very rarely. Such a cyst may start as a unicentral growth (giving one large cyst) or as a multicentral growth (giving two or more primary cyst cavities).

Pseudomucinous cysts very rarely rupture spontaneously.

They rarely form peritoneal metastases. The apparent peritoneal metastases that result from rupture of such a cyst or from contamination during removal are due simply to the persistence of groups of cells that have lodged on the peritoneum and secured temporary nourishment, and go on for a time producing pseudomucin. There is rarely any real growth or multiplication of the adherent epithelial cells. They usually live for a short time only and then disappear. Occasionally, however, there is multiplication of these cells, and growth all through the abdominal cavity, giving rise to the rare condition known as "pseudo-myxoma peritonei." The peritoneal cavity becomes filled with the pseudomucinous material, which is reformed again and again after removal. Most of these patients finally succumb to mechanical interference by the spreading pseudomucinous growth or to the secondary development of malignant disease.

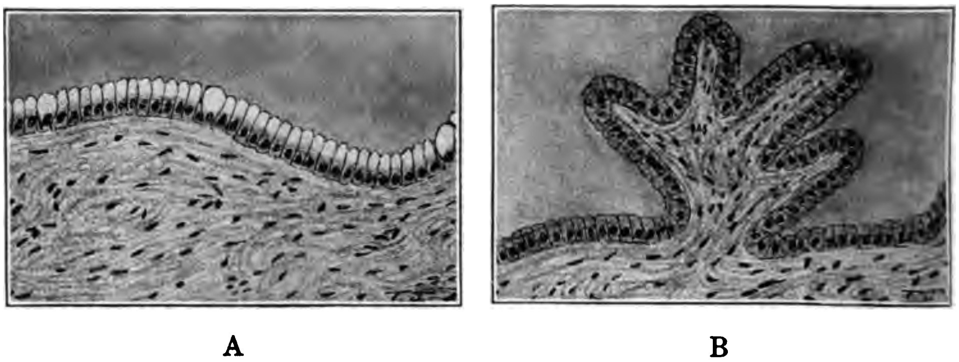

Fig. 690. Indicating the difference between the cells lining a pseudomucinous cyst (A) and those lining a serous cyst (B), as explained in the text.

Pseudomucinous cysts rarely undergo malignant change, except as above stated.

The cause of the pseudomucinous cyst is not known certainly. They probably start from the primordial follicles. This is indicated by the fact that in the small secondary cysts, in the wall of the main cyst, perfect ova have been found. These ova were formed after birth. According to accepted theories, the only cells in the ovary capable of forming ova after birth are those of the primordial follicles. All the other cells have been differentiated past this stage.

Serous Cystadenomata. These are known also as "papillary cysts" and as "cystadenomata invertens." The contents of the serous cyst partakes of the nature of serum and does not present the gelatinous character of that of the pseudomucinous variety. On chemical examination the contents show a large amount of albumen and no pseudomucin. The contents of the serous cysts, like that of the other variety, may vary much in color and consistency—this variation being due to the amount of hemorrhage into the cyst. The cells apparently have no secretion, and consequently there is no marked intra-cystic pressure as there is in the pseudomucinous cyst. On account of this absence of internal pressure the cells, as they proliferate,

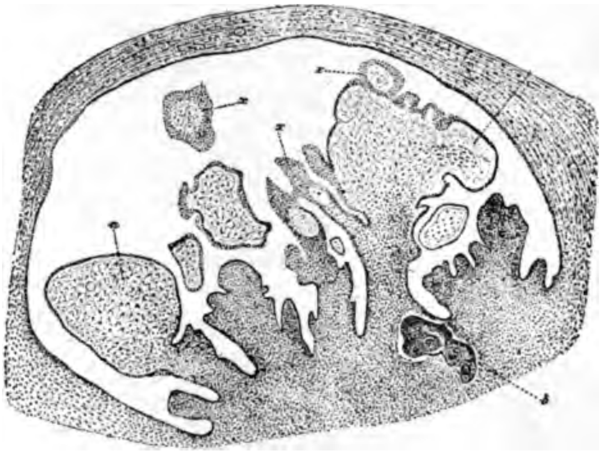

Fig. 691. A Papillary Cystadenoma of the Ovary. The papillary projections within the cyst grow to the opposite wall and then penetrate it. (Pfannenstiel—*Veit's Hand-Buch.*)

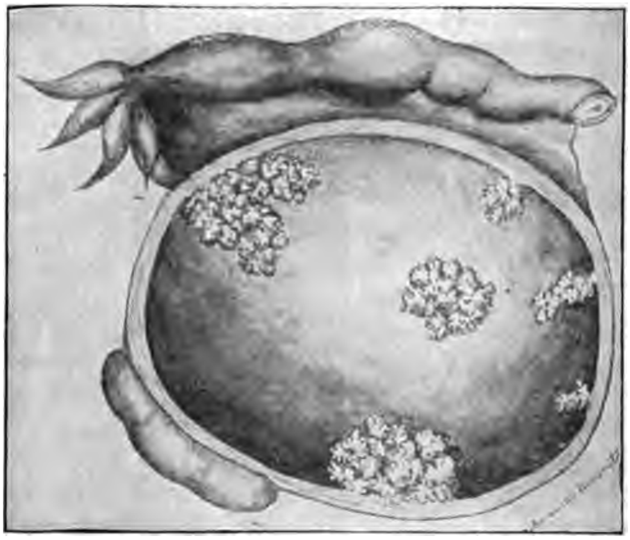

Fig 692. A Papillary Cystadenoma, sectioned and showing the papillary projections into the cyst c (Penrose—*Diseases of Women.*)

pile up, forming papillary projections into the interior of the cyst (Figs. 691, 692)—hence the name "invertens." These papillary masses (consisting of a layer of epithelial cells and some stroma), when they come in contact with the opposite wall of the cyst, penetrate the wall and appear outside as papillary growths on the external surface of the cyst (Fig. 693).

Usually a few gland-like eversions may be found in the wall, but they are insignificant. Occasionally, however, a serous cystadenoma will present nearly altogether evertent growths (gland-like projections into the wall of the cyst)—serous cystadenoma evertens.

The cells lining the serous cyst present the following characteristics:

They contain no pseudomucin, hence they stain throughout (Fig. 690, b).

There are no goblet cells—all plain columnar cells.

They have cilia.

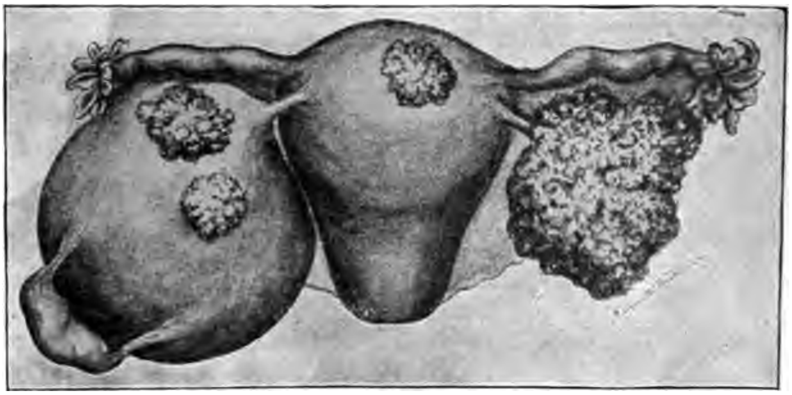

Fig. 693. Papillary Cystadenoma of each Ovary. On the left side the internal papillary projections have grown through the opposite wall and appear on the external surface. On the right side the papillary growths have obliterated all resemblance to a cyst, and appear simply as a cauliflower growth in the region of the ovary. Notice the metastasis on the peritoneal surface of the uterus. (Penrose—*Diseases of Women*.)

A serous cystadenoma may start as either a unicentral or a pluracentral growth. It does not form such a large tumor as the pseudomucinous cyst, and it is nearly always unilocular, except when it begins as a pluracentral growth. Serous cysts are usually bilateral and in this they differ markedly from the pseudomucinous variety.

A striking feature of these serous cysts is that local metastases usually take place. When such a cyst ruptures, extensive local metastases form on adjacent peritoneal surfaces, producing papillomatous growths. These growths show no malignant structure, but they may kill the patient by extensive local growth, though they do not penetrate adjacent organs nor cause distant metastases. They may, however, and in fact very frequently do, undergo malignant change, in which case they become ordinary carcinomata.

The origin of the serous cysts is not settled. Some authorities hold that they arise from the membrana granulosa of the Graafian follicle. It is held by others that they arise from parovarium duct-remnants in the ovary, and there are some facts that tend to support this theory. In structure they resemble closely certain parovarian cysts, and remnants of parovarian ducts are found in the ovary near the hilum, which is just the part of the ovary from which these cysts apparently take their origin. Moreover, they differ from the common form of ovarian papilloma, which originates from the surface layer of epithelium (the germinal epithelium), though the term "ovarian papilloma" is sometimes applied to the papillomatous growth resulting from the early rupture of a serous cyst and in which the cyst character has largely disappeared.

The characteristics of the pseudomucinous and serous cysts may be presented and contrasted concisely as follows:

Proliferating Cysts.

(Cystadenomata.)

Pseudomucinous Cyst. (Cystadenoma Evertens).	**Serous Cyst.** (Cystadenoma Invertens).
1. Contents gelatinous and secreted by the cells lining the cyst—may be any color.	1. Contents serum-like and not secreted by the cells lining the cyst—may be any color.
2. Secondary growths consist of gland-like projections outward (evertent) from the cavity into the wall, forming small cystic cavities in the wall.	2. Secondary growths consist of papillary projections inward (invertent) from the wall into the cavity, forming papillary masses which extend across the cavity and penetrate the opposite wall.
3. Lining cells contain pseudomucin, are columnar, with some goblet cells, and are not ciliated.	3. Lining cells contain no pseudomucin, are plain columnar, without goblet cells, and are ciliated.
4. Nearly always unilateral.	4. Nearly always bilateral.
5. Rarely rupture spontaneously.	5. Usually rupture at an early stage, because of perforation of the wall by the papillary ingrowths.
6. Rarely cause peritoneal metastases.	6. Usually cause peritoneal metastases, consisting of widespread papillary growths.
7. Rarely undergoes malignant change.	7. Frequently undergoes malignant change.
8. Very common.	8. Rare.
9. Cause unknown. Probably start from primordial follicles.	9. Cause unknown. Probably start from parovarian tube-remnants in the ovary.

Taking up the clinical manifestations of the proliferating cysts (both pseudomucinous and serous), it is found that they may **occur at any age**, but are most frequent during the period of greatest ovarian activity—i. e., between the twentieth and fiftieth years. Either ovary may be affected. They are bilateral in only about 3 per cent. of the cases, while malignant tumors of the ovary are bilateral in about 75 per cent. of the cases. As I mentioned before, the serous or papillary proliferating cysts are usually bilateral, but they constitute only a small proportion of proliferating cysts—most of such cysts being of the pseudomucinous variety.

In **shape**, a proliferating cyst may be spherical and regular in outline, indicating a single large cyst, or it may be irregular, presenting nodules indicating a multilocular cyst. In **size** these cysts vary from a small tumor the size of an egg to a large tumor filling the whole abdomen.

As to **appearance** when exposed by abdominal incisions, the wall of the cyst presents a white, glistening appearance. The thinner portions are straw-colored or green or black, according to their fluid contents. The surface of the cyst may be perfectly smooth or may be covered by a papillary growth, or may be bound to adjacent structures by adhesions. The tumor usually has a distinct pedicle.

The cysts are divided into three classes according to their **internal structure**—unilocular, multilocular and areolar. Unilocular cysts may be very large, but they are found to consist of only one large cyst. However, the interior frequently shows remains of trabeculae, indicating that they were at one time multilocular cysts. Multilocular cysts contain two or more cysts of medium size, besides a large number of smaller cavities (Fig. 689). Areolar cysts are made up of a large number of small cavities of various sizes and shapes.

The **cyst wall** consists of three layers—an outer and inner firm fibrous layer, with a middle layer of looser tissue between them. In the middle layer of loose connective tissue the vascular supply is distributed. Those vessels which come near the outer surface may often be plainly seen, and they are frequently very large. The external surface of the cyst-wall is covered with columnar epithelium, derived from the germinal epithelium covering the surface of the ovary and differing from the endothelium of the peritoneum. The internal surface is lined with low columnar cells. The lining membrane is often covered with vegetations and irregular growths, both cystic and solid.

The contents of cysts present marked contrast in consistency and in color. The contents may be thin like water (serous cysts), or thick and viscid and of gelatinous consistency (pseudomucinous cyst). The contents may be almost colorless or straw-colored or a dirty yellow, or green or black. The color depends on hemorrhage into the cyst. The coloring matter of the blood becomes the coloring matter of the cyst contents.

As these cysts enlarge they bear various **relations** to adjacent structures. If they rise out of the pelvis and enlarge in the abdomen, they may attain a very large size before producing serious symptoms. They there have plenty of room and expand freely, pushing aside the surrounding organs. If they become caught under the pelvic brim and develop in the pelvis, they soon begin to cause pain and other disturbances from pressure and distortion of the organs.

The proliferating papillary cysts, or serous cysts, before described, usually rupture rather early and fill the pelvis with papillary growths. In such a case the first impression, when the abdomen is opened, is that the pelvis is filled with a cancerous mass, which cannot be removed and which will soon cause death. Accordingly, in not a few cases, the operator, after scraping out some of the papillary bleeding growth, has closed the abdomen and told the patient or her friends that there was an inoperable cancer and that she could not long survive. Some such patients get entirely well after the operation. In other cases malignant change has already begun or begins later and the patient dies of carcinoma. In still other cases the growth itself becomes so extensive as to interfere with the functions of adjacent organs and thus causes death.

Dermoid Cysts of the Ovary.

Dermoid cysts are those in which are found skin or mucous membrane, associated with structures generally connected with the epidermal tissues. The structures most frequently found are hair, teeth, bone, muscle-fibers, skin and small balls of sebaceous material resembling fat (Figs. 694, 695, 696, 697).

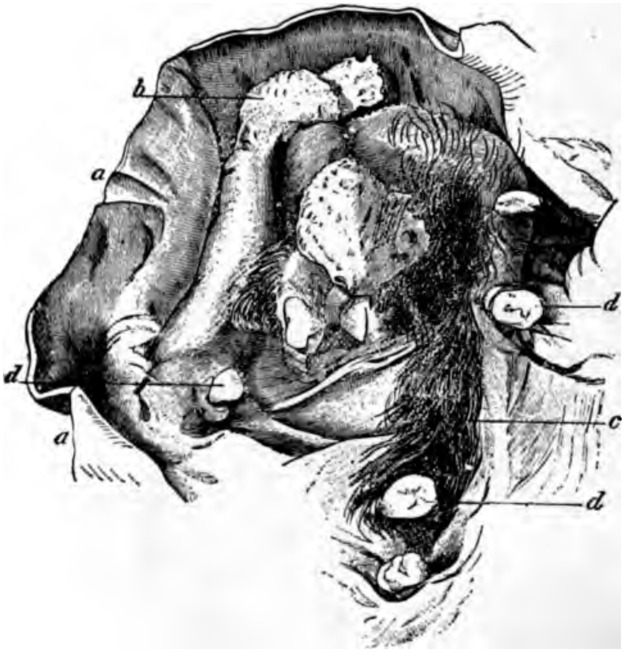

Fig. 694 Portion of the Wall of a Dermoid Cyst of the Ovary. a, Wall of cyst. b, **Mass of cutaneous tissue** c, Hair. d, Teeth. (Thomas and Munde, after Ziegler—*Diseases of Women.*)

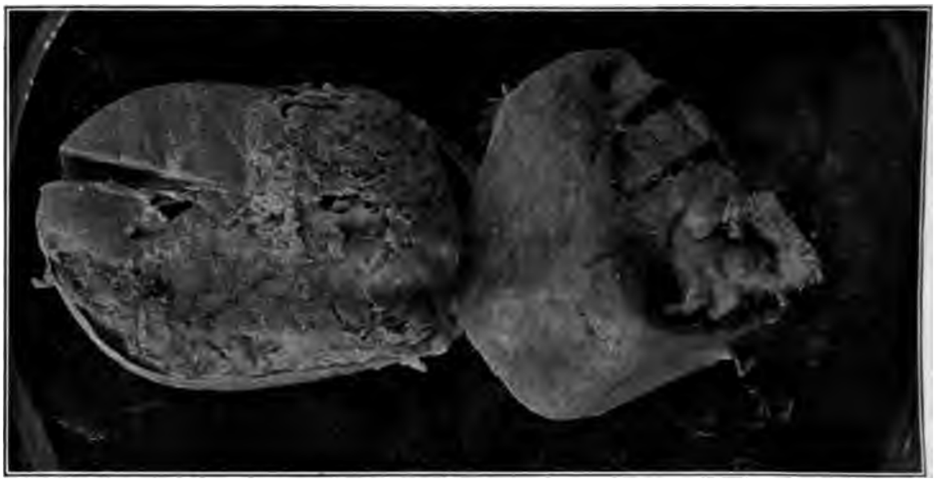

Fig. 695. A small Dermoid Cyst, showing teeth, hair, sebaceous material and firm fat-tissue. The teeth, shown in the right side, are unusually well developed and constitute a point of special interest in this specimen. (Specimen of Dr. F. J. Taussig.)

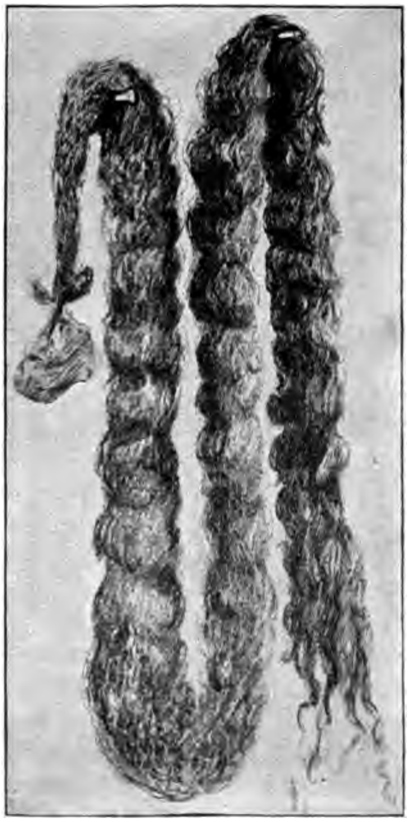

Fig. 696. Hair, five and a half feet long, from a Dermoid Cyst. (Thomas and Munde—*Diseases of Women.*)

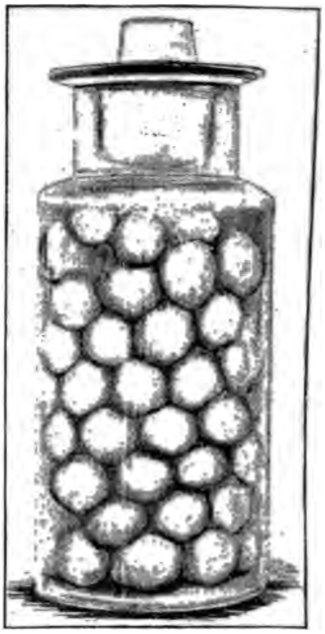

Fig. 697. Balls of Sebaceous Material from a Dermoid Cyst. (Thomas and Munde—*Diseases of Women.*)

Dermoid tumors may appear at any age. They have been found in children at birth and in women of ninety years.

Dermoid tumors of the ovary are comparatively small, rarely getting larger than a child's head. But they are more dangerous than the ordinary large cysts, for the dermoid cysts usually present more and firmer adhesions, and their contents are more irritating, so much so that the escape of any of the contents into the peritoneal cavity is likely to cause a fatal peritonitis. They are much more liable to suppuration and consequent abscess formation than the ordinary cysts.

SYMPTOMS AND DIAGNOSIS

of Ovarian Cysts.

As the simple cysts seldom give rise to serious trouble and the dermoid cysts are rare, the symptoms to be mentioned belong to the proliferating cysts and principally to the pseudomucinous variety, as the vast majority of cystic ovarian tumors belong to this class.

An ovarian cyst usually develops slowly and may attain considerable size before it is discovered. Often it is noticed then only by accident.

The earliest symptoms are a feeling of weight and pressure in the pelvis, bladder irritability, slight menstrual disturbance, constipation and perhaps some pain with bowel movement. The symptoms are not distinctive, but simply indicate some disturbing factor in the pelvis. As the tumor increases in size, distinct pressure-symptoms appear and the general nutrition becomes affected. There is enlargement of the abdomen, swelling of the feet from pressure on veins, pain from pressure on nerves and dyspnoea from pressure on the diaphragm. There appear, also, stomach disturbances, emaciation and progressive weakness. In some cases there are attacks of local peritonitis, with severe abdominal pain and some fever, but these inflammatory symptoms are due to complications and do not belong to the natural history of the tumor.

Ovarian cysts grow slowly, usually taking several years to reach a large size. But they seldom stop growing. They persistently enlarge until the patient finally dies from exhaustion brought about by pressure-effects on vital organs.

The diagnosis in typical cases is easy, but in complicated cases it may be very difficult, and in exceptional cases a positive exact diagnosis is impossible before operation. Tapping the cyst through the abdominal wall as an explorative measure should not be employed. An adherent coil of intestine may be punctured, or cyst contents may leak into the peritoneal cavity and cause fatal peritonitis. In a doubtful case an exploratory abdominal section is safer and far more satisfactory in diagnostic results.

In taking up the differential diagnosis of ovarian cysts, it is at once apparent that the symptoms and diagnostic points are different in the different-sized tumors.

Small Ovarian Cyst.

Considering the small ovarian cyst according to the "Points in the Differential Diagnosis of Various Masses in the Pelvis and Lower Abdomen" (Diagnostic Table, page 287), it is found that an ovarian cyst of this size presents the following characteristics (the numbers refer to the "Points" in the Diagnostic Table).

1. Is situated in the lateral part of the pelvis, though in exceptional cases it may drop down directly behind the uterus or in front of it.

2. The small ovarian cyst is the size now under consideration—about as large as the fist or a little larger.

3. Is approximately spherical, though may be made uneven by secondary cysts.

4. Contains fluid (fluctuates).

5. Is not tender, unless complicated by inflammation or by torsion of pedicle.

6. Is freely movable, unless complicated by adhesions or caught under the sacral promontory.

7. Is attached in the lateral part of the pelvis.

8. Apparently arises from the tubo-ovarian region.

9. Lies beside the uterus, but is not attached to it and does not ordinarily modify it in any way, except to cause some displacement towards the opposite side.

18. Occupies the tubo-ovarian region.

36. Symptoms slight, unless complicated. No history of fever or of attacks of pelvic inflammation.

50. Progressive increase in size, without inflammatory symptoms.

57. Fallopian tube lies close to the mass, but can in some cases be distinguished from it. The ovary is not found because incorporated in the mass. The uterus is of normal size, though it may be somewhat displaced. The mass is freely movable, unless complicated, and can be separated from the uterus and from the pelvic wall and from the Fallopian tube and from most of the broad ligament, but not from the ovary.

The following conditions may be confounded with a small ovarian cyst and must therefore be taken into consideration in the **differential diagnosis:**

a. Inflammatory Mass (salpingitis with exudate, pyosalpinx, hydrosalpinx).
b. Tubal Pregnancy.
c. Fibroid Tumor of the Uterus.
d. Retroverted Pregnant Uterus.
e. Broad Ligament Cyst.

a. Inflammatory Mass. There are three kinds of masses resulting from inflammation or allied conditions that must be taken into consideration.

Salpingitis with exudate presents a mass which is (1) situated in the tubo-ovarian region, (2) irregular in shape, (3) firm, (4) very tender, (5) fixed by adhesion, (6) attached to both the pelvic wall and the uterus, (7) apparently originates in adnexal region, (8) attached to upper lateral part of uterus, but a sulcus can be made out between the uterus and the mass, (15) uterus fixed, but not otherwise modified except perhaps somewhat displaced to the opposite side, and (16) there is discharge from the uterus due to the preceding endometritis. The tube and ovary are (18) included in the mass, (19) the mass is adherent to the pelvic wall, (23) there may be a mass about the opposite tube, (32) there is fever if the trouble is acute, there is a history of (36) sudden onset, with pain in the lower abdomen and fever, and confinement to bed following labor or miscarriage or instrumentation, or gonorrhoea or chronic endometritis, (37) remissions and exacerbations with pelvic pain and disability, (38) menstrual disturbance (usually painful menstruation), (40) leucorrhoea, (41) backache practically all the time and acheing in pelvis, with sharp pain in pelvis during the exacerbations, (42) fever more or less during the exacerbations, (43) some disability all the time and usually confined to bed for a few days or longer during the exacerbations. Any increase in size (50) is accompanied by inflammatory symptoms. If the patient is examined under anesthesia, it is found that (51) the mass occupies the region of the tube and, usually, includes the ovary also, (53) is firm throughout, (54) is fixed by adhesions, (55) is attached to surrounding organs, (56) originates from the tube or ovary, (57) the mass can be differentiated from the uterus, but not from the tube and usually not from the ovary, and (58) the uterus is normal except for the leucorrhoeal discharge and the fixation, and perhaps some displacement towards the opposite side.

Pyosalpinx presents practically the same symptoms and signs, except that the one or more points of fluctuation are present and the tenderness is more marked, and the inflammatory symptoms and exacerbations are more severe.

In **hydrosalpinx** the inflammatory symptoms have practically disappeared, leaving the distended fluctuating tube with some adhesions. It differs from the ovarian cyst in that (3) the mass in typical cases is elongated and "sausage-shaped," (6) is less movable than the ovarian tumor, (7) is attached to the pelvic wall and to the uterus, though in some cases the attachment is not very close, (8) appears to arise from all along the upper margin of the broad ligament, (18) the tube is included in the mass, while the ovary can in some cases be differentiated, (36) there is a history of previous pelvic inflammation, (38) menstrual disturbance and other evidence of previous inflammation in the uterus, and (57) if patient is examined under anesthesia it may usually be determined definitely that the tube is involved in the mass and that the ovary is separate.

b. Tubal Pregnancy presents the pain, disability, tenderness and fixation of an inflammatory mass, with little or no fever, but with the addition of the special evidences of extra-uterine pregnancy given in the previous chapter (page 773).

c. Fibroid Tumor of uterus presents a mass which **differs from an ovarian**

cyst in that it is (1) situated near the center of the pelvis, (3) irregular in shape, (4) firm throughout, or if it is a cystic fibroid the larger part of the mass is firm, (6) not movable separately from the uterus, but the mass and the uterus are movable in the pelvis, (7) attached to the uterus, (8) apparently arises from the uterus, and (9) is so intimately associated with the uterus that it seems to be part of the organ. The uterus is usually (10) displaced somewhat by the mass, (11) increased in size, (12) irregular in shape and (16) presents some discharge from the accompanying endometrical disturbance. There are (23) likely to be other masses projecting from the uterus and there is a history of (38) menstrual disturbance (usually excessive menstruation), (40) leucorrhoea, (41) pressure and aching in the pelvis and (57) if the patient be examined under anesthesia it is found that the mass is intimately associated with the uterus and that the tubes and ovaries are separate, unless the mass is so large as to obscure these structures.

d. Retroverted Pregnant Uterus. This would cause confusion in diagnosis only when incarcerated in the pelvis so that it could not be raised sufficiently to be brought forward nor satisfactorily outlined. It would then differ from an ovarian cyst in that the mass is (1) situated in the median line, (4) partly solid, (5) tender, (6) not movable, (7) filling posterior part of pelvis, (8) seems to be a continuation of the cervix uteri and (9) apparently the expanded uterus containing fluid. There is softening (13) of the cervix and corpus uteri and (17) venous discoloration of the cervix and vagina. There is a history of (38) amenorrhoea, (46) morning sickness and (47) pains and tenderness in the breasts. If the patient is examined under anesthesia (57), the mass is identified with the uterus (enlarged, softened, retroverted and containing fluid), and the tubes and ovaries are distinguished as separate unless the mass is so large that it obscures them.

e. Broad Ligament Cyst. This differs from the ovarian cyst in that it is (1) situated deeper in the pelvis, (6) not so movable, (7) attached to pelvic wall and uterus, (8) originates in the lateral pelvic region, (9) extends down the side of the uterus toward the cervix, (10) displaces the uterus markedly toward the opposite side and (15) fixes the uterus to some extent. If the patient be examined under anesthesia, it is found (57) that the mass is located in the broad ligament below the tube, and the tube and ovary can be distinguished as separate unless obscured by the mass.

Large Ovarian Cyst.

A growth large enough to cause the abdomen to be prominent must be differentiated from the following conditions:

a. Tympanites and "Phantom Tumor."
b. Obesity.
c. General Ascites.
d. Pregnancy (normal, with hydramnios, extra-uterine).
e. Cystic Fibroid of Uterus.

f. Distended Bladder.
g. Tumor of some abdominal organ.
h. Tubercular Peritonitis.

a. Tympanites presents resonance over all the abdomen. The vagino-abdominal examination shows that there is no abdominal mass in the pelvis or lower abdomen (Fig. 132). "Phantom tumor" is a term applied to certain conditions produced by irregular contraction of the abdominal muscles (forcing tympanitic intestines into some locality in such a way as to give the appearance of a tumor), accompanied with marked hyperesthesia. It occurs usually in hysterical subjects and the apparent tenderness may be so marked as to prevent satisfactory palpation, either abdominal or bimanual. Usually it can be made out that there is distinct resonance over the swelling and that there is no abnormal mass in the pelvis. When in doubt, examine the patient under anesthesia, when the muscular tension and the consequent "tumor" will disappear.

b. Obesity may produce marked prominence of the abdomen and has been mistaken for ovarian cyst (Fig. 122). Resonance may be obtained in deep percussion over all the abdomen, showing that there is no mass between the intestines and the abdominal wall. Also, in picking up the wall to test its thickness (Figs. 119, 120) it is found that most of the prominence is due to the thickness of the wall. On vagino-abdominal examination no abnormal mass is felt in the pelvis or lower abdomen.

c. General Ascites presents ordinarily, when the patient is lying on her back, resonance at the top of the abdomen and dullness in the flanks (Figs. 185, 186). When the patient changes posture the outline of dullness changes, as the free fluid goes to the lowest part of the peritoneal cavity (Fig. 188). There is a percussion wave in ascites (Figs. 35, 36). Vagino-abdominal examination shows that there is no mass in the pelvis or lower abdomen. The presence of disease of the heart or liver or kidneys sufficient to account for the ascites is a point in favor of the same.

d. Pregnancy. Normal pregnancy presents missed menses, morning sickness, enlarged breasts, vaginal and cervical discoloration and softening of the cervix. The examiner can usually distinguish the fetal parts and may be able to feel fetal movements or hear the fetal heart sounds. In pregnancy with **hydramnios** the symptoms and signs are about the same as in normal pregnancy, except that there is more fluid, and consequently it is the more difficult to feel the fetus or to get the fetal heart sounds. In **extra-uterine pregnancy** there are the usual symptoms of pregnancy, with the addition of certain anomalous symptoms, indicating that the pregnancy is in the peritoneal cavity instead of within the uterus. Also, in the early history of the trouble there are indications of pelvic inflammation, with the added special characteristics of tubal pregnancy enumerated in the preceding chapter (page 773).

e. Cystic Fibroid. This presents an irregular mass situated in the central part of the pelvis, and apparently it arises from or is a part of the uterus, from which it can not be separated. A large part of the mass is firm. It distorts the uterus and increases the length of the cavity. There is usually a history of excessive menstruation and of leucorrhoeal discharge.

f. Distended Bladder. It has happened that a distended bladder went unrecognized until rupture of the bladder and death of the patient. In a case of distended bladder the history shows first difficulty in passing urine and later constant dribbling of urine due to the overdistention. There may be symptoms of uremia. When the patient is catheterized the supposed tumor disappears, but it may require a very long catheter to reach the urine because of the distortion and lengthening of the urethra.

g. Tumor of Some Abdominal Organ. This presents the fixed or least movable portion at some organ in the abdomen, the rounded free border extending toward the pelvis or into the pelvis. The mass may be displaced upward into the abdominal cavity and then the pelvis is clear. There are symptoms associated with the organ involved, and no particular symptoms of disturbance of the pelvic organs.

h. Tubercular Peritonitis. There is fluid in the abdominal cavity, either free or encysted, associated with evidences of tubercular inflammation in the pelvis (page 763) or in the abdominal cavity or in both. There are frequently evident signs of tuberculosis elsewhere, usually in the lungs or in the intestines. The tuberculin reactions may aid materially in determining whether the intra-abdominal trouble is tubercular.

COMPLICATIONS.

Having determined that an ovarian cyst is present, we must then consider certain complications that may be present or that may appear later. These complications are as follows:

1. Local peritonitis, forming adhesions.
2. Hemorrhage into the cyst.
3. Rotation of the cyst, producing torsion of the pedicle.
4. Inflammation and suppuration of the cyst.
5. Rupture of the cyst.
6. Ascites accompanying the tumor.
7. Intestinal obstruction.

1. Local peritonitis is accompanied with some pain and tenderness over a part of the tumor. There may be some fever, but usually this symptom is not marked; the process consists simply of irritation at some portion of the outer surface of the cyst and the formation there of plastic exudate, binding the cyst to some adjacent organ or to the abdominal wall. In a few days the pains disappear, but the exudate remains, becomes organized and forms an adhesion, which may interfere more or less with the subsequent operation.

2. Hemorrhage into the cyst is what gives the various colors to the cyst contents. This hemorrhage usually takes place slowly in small quantities and without clinical symptoms. Occasionally, however, a copious hemorrhage takes place, usually from some interefence with the venous return, such as twisting of the pedicle or pressure of an enlarged uterus, or it may follow tapping of the cyst. The hemorrhage may be so severe as to cause collapse of the patient.

3. **Rotation of the cyst** may take place where the pedicle is long (Figs. 427, 698). The amount of rotation varies from a half turn to several complete turns. Torsion of the pedicle is supposed to be favored by an injury, such as a fall or blow, and by active exercise, and also by the alternate filling and emptying of the bladder and the bowel, and during pregnancy by the enlargement of the uterus.

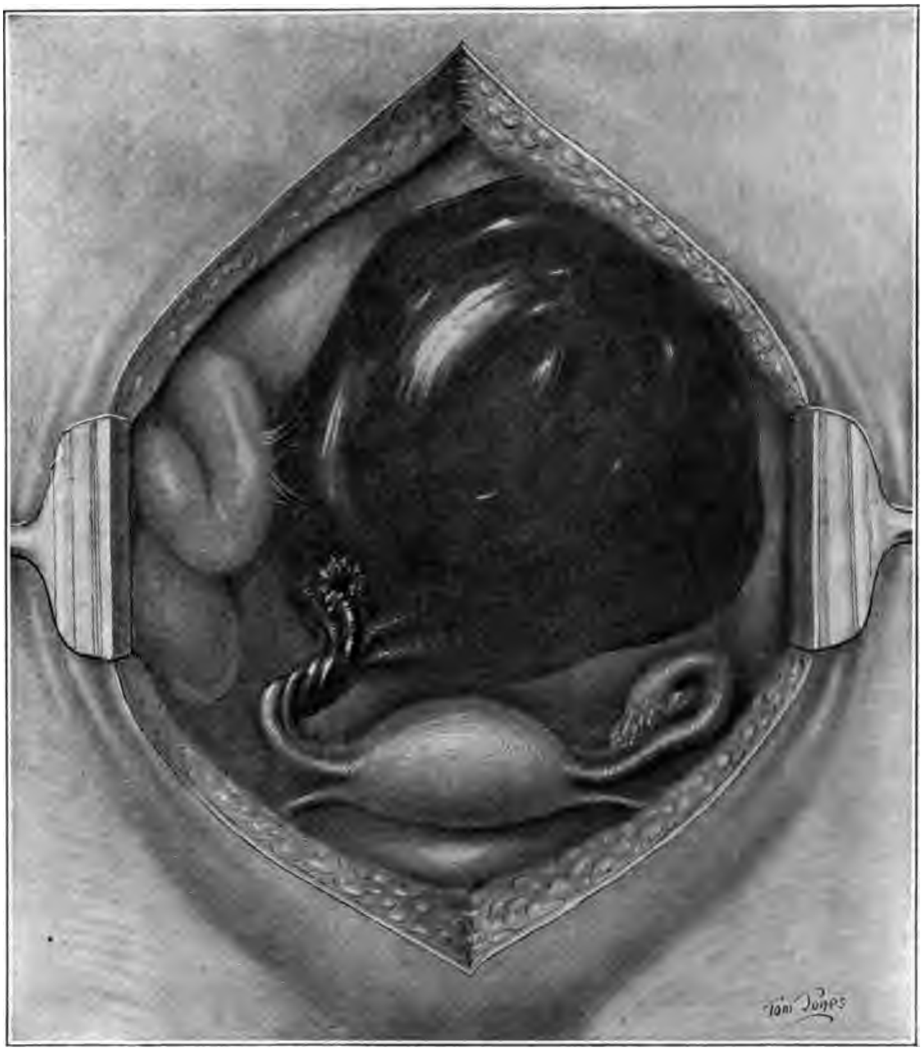

Fig. 698. Rotation of an Ovarian Cyst. The turning of the tumor twists the pedicle, blocking the circulation and causing thrombosis in the pedicle and throughout the tumor. The extravasation of blood causes the affected tissues to become black.

The effect of torsion of the pedicle on the circulation of the tumor depends, of course, on the amount of rotation. The veins are the first to suffer. The flow of blood in them is impeded, causing the tumor to become engorged, and there is hemorrhage into the interior of the cyst, either in the form of extravasation or the rupture of a vein with severe hemorrhage. If the twisting increases, there is thrombosis of the vessels and extravasation of bloody fluid into the peritoneal cavity, and later necrosis of the tumor, followed by fatal peritonitis. The hemorrhage into the tumor causes it to appear black (Fig. 687). The symptoms of torsion of the pedicle are very marked. When a patient with an ovarian tumor complains of sudden pain in the abdomen and has vomiting, and there is a sudden increase in the size of the tumor, it is probable that torsion of the pedicle has taken place. In some cases there are repeated attacks of slight torsion.

4. Inflammation and Suppuration of the Cyst. This is, of course, due to infection. The infection may come from the intestinal canal or from the bladder or from a Falliopian tube or from tapping the cyst. The most common source of infection is the Fallopian tube. The patient contracts salpingitis, adhesions form between the inflamed tube and the cyst wall, and infection spreads along these adhesions and invades the cyst. Adhesions with some portions of the intestinal tract, especially with the appendix, may likewise lead to infection of the cyst. Tapping, which was formerly common, often led to infection of the cyst. Dermoid cysts are especially prone to suppuration.

The symptoms of suppuration of the cyst are pain, fever, tenderness over the tumor, rapid pulse and exhaustion and emaciation. If the suppurating cyst does not speedily cause death by peritonitis, it may later rupture into the intestine or bladder or vagina. The teeth, hair and pieces of bone discharged in rare cases from the urethra or rectum are usually due to suppuration of a dermoid cyst.

5. Rupture of the cyst may be sudden, as from a fall or blow or other injury, or it may be the result of a gradual thinning of the cyst wall. The result of rupture of the cyst depends on the quantity and quality of the cyst contents. In unilocular cysts with non-irritating fluid the rupture may produce no severe symptoms. There is some weakness and abdominal pain and marked diuresis, the patient sometimes passing several gallons of urine in twenty-four hours. The abdomen, which was before prominent from the tumor, becomes flattened and lax. The physical signs change from those of encysted fluid to those of free fluid (pages 157 and 162). The cyst may not refill, and if no inflammation takes place the patient recovers. But this favorable termination takes place only in rare cases. In the great majority of cases of cyst, rupture causes peritonitis, which may be very severe and rapidly fatal.

Rupture of a cyst is indicated by the sudden disappearance of the tumor or marked diminution in its size, accompanied with evidences of free fluid in the peritoneal cavity and collapse of patient, and later peritonitis and death.

6. **Ascites.** A small amount of ascitic fluid may be present with many cysts, but a large quantity is rare so long as the tumor retains its normal condition. Consequently the presence of considerable ascitic fluid with an ovarian cyst becomes of diagnostic importance. The ascites may, of course, be due to some heart trouble or kidney trouble or liver trouble, or may be due to peritoneal tuberculosis. Aside from such complications, ascitic fluid is indicative of some serious complications—e. g., a papillary cyst, especially after malignant change, or rupture of an ordinary cyst.

7. **Intestinal Obstruction.** This may be caused by direct pressure of the tumor or by adhesions which contract and narrow the intestine. It is of course a very serious complication and is indicated by the ordinary symptoms of intestinal obstruction appearing in the presence of an ovarian tumor.

TREATMENT

of Ovarian Cysts.

The treatment of the **simple cysts** of the ovary is symptomatic. There is no method of affecting these little cysts directly except by operation, and the symptoms are usually not severe enough to warrant operation. Consequently, the treatment is directed toward relieving the symptoms, and consists of the measures recommended under chronic pelvic inflammation for relieving the same symptoms. If the symptoms are persistent and very troublesome in spite of all minor measures, the abdomen may be opened and the cysts removed, saving as much as possible of both the ovaries.

The treatment of the **proliferating cysts** and **dermoid cysts** is removal by operation as soon as found, if the condition of the patient will permit.

Ovarian tumors are not at all influenced by palliative measures, they do not stop growing spontaneously and they tend to death within a few years. Consequently they should be removed as soon as found or as soon as the patient can be gotten into condition for the operation. Sometimes the patient is in such a weakened condition that she must be given a course of treatment before operation. Some general disease, such as kidney or heart or lung trouble, may make it necessary to delay the operation until the patient can be put in better condition.

Then, again, the patient may be in such condition that a radical operation would be almost certainly fatal. In such a case it would of course be useless to operate. In some such inoperable cases the patient may be rendered temporarily more comfortable by tapping the cyst with a trocar and drawing off the fluid. In all cases of proliferating cysts, however, in which the patient is in suitable condition, the tumor should be removed by operation.

SOLID TUMORS OF THE OVARY.

Solid tumors of the ovary are rare. They comprise only about five per cent. of all ovarian growths that come to operation.

The simple tumors are fibromata and fibromyomata. These growths are infrequent and usually small, though occasionally one will grow to weigh ten or fifteen pounds.

Of the malignant growths, sarcoma is said to be the most frequent. It may be of the spindle-cell or round-cell variety, and usually grows rapidly. As a rule both ovaries are affected.

Carcinoma of the ovary is generally secondary to a papillary cyst. Both ovaries are affected in the majority of cases.

Owing to the rarity of solid tumors of the ovary and the absence of distinctive symptoms, the diagnosis is usually made only after the abdomen is open.

In the case of a firm mass presenting the symptoms and signs already described for a small ovarian tumor (except fluctuation) a probable diagnosis of solid tumor of the ovary may be made.

The treatment for a solid tumor of the ovary is prompt removal by operation.

TUMORS OF THE PAROVARIUM.

The tumors of the parovarium (broad-ligament tumors) are almost invariably cysts and they are of two kinds, simple cysts and papillary cysts.

The **simple cysts** are single cysts containing clear fluid resembling water. On account of their confined position they produce very troublesome symptoms while still small. They arise from various parts of the remains of the Wolffian body (parovarium, paroophoron—Figs. 681, 682).

The **proliferating papillary cysts** arise also from the remnants of the Wolffian body and their characteristic is the development of papillary growths in the interior of the cyst, which fill the cyst and grow through its wall, and spread to the peritoneal surface and the adjacent organs (uterus, ovaries, intestines). The whole pelvis may be filled with these warty cauliflower growths and, having spread to all the adjacent structures, they often give rise to an erroneous diagnosis of cancer.

In the majority of cases they are bilateral and usually rupture before attaining a large size. Though they grow rapidly and spread to adjacent organs, where they implant themselves on the peritoneal surfaces and grow freely, they do not have the fatal infiltrating and destructive tendency of malignant disease, and many patients recover when the abdomen is opened and the larger part of the growth removed. Later they may undergo malignant change, and then they present the usual characteristics of carcinomata.

These proliferating papillary cysts arise from the parovarium. As most parovarian tubules lie in the broad ligament, the papillary cysts are usually broad ligament cysts. But they may also arise from that part of the parovarium which is prolonged into the hilum of the ovary. It is from that location that the papillary cysts of the ovary arise. As mentioned before, the papillary cysts of the ovary are usually bilateral and present all the characteristics of the broad ligament papillary cysts, except that they arise from the ovary instead of from the broad ligament. They are supposed to arise from the remnants of Wolffian tubules lying in the medullary portion of the ovary.

Symptoms and Diagnosis.

In the clinical history and in the signs obtained by examination, broad ligament tumors resemble ovarian tumors very closely. Practically the same symptoms and signs which serve to distinguish an ovarian tumor from other diseases serve, also, to distinguish a broad ligament tumor from the same diseases. So that as a rule, in this condition, when there is trouble in diagnosis, the difficulty is to tell whether the tumor present is a broad ligament tumor or an ovarian tumor.

The characteristics of the ordinary parovarian cyst, or "broad ligament cysts," as they are usually called, are as follows:

1. They grow into the broad ligament, separating its layers and displacing the adjacent organs. The uterus is pushed far to one side (Figs. 699, 700, 388) and the tube is usually stretched over the cyst, being much lengthened and flattened. The ovary also is flattened out on the surface of the cyst. There is more or less fixation of the cyst and also of the displaced uterus. They may grow under the peritoneum and separate it from the rectum, bladder and abdominal wall.

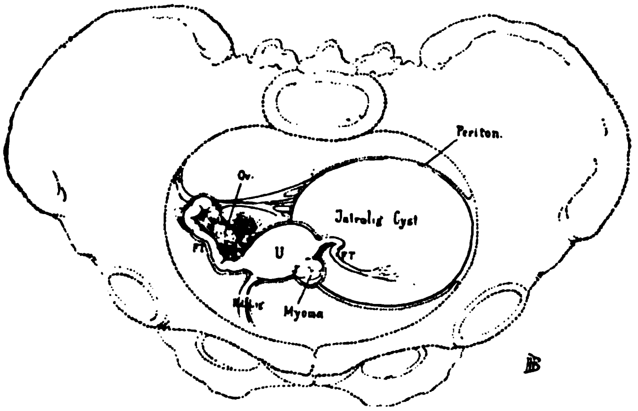

Fig. 699. A Parovarian Cyst (broad ligament cyst) of the left side. Notice how it separates the layers of the broad ligament and also displaces the uterus. (Kelly—*Operative Gynecology*.)

2. They produce serious symptoms much earlier than ovarian cysts. This is due to their being confined within the broad ligament and the pelvis, and hence making serious pressure on surrounding organs while they are still small. For this reason they cause more pelvic pain and more menstrual disturbance than ovarian cysts of the same size.

The papillary cyst, after rupture and spread of its papillary growths, may produce a clinical picture very much resembling tubercular peritonitis or chronic pelvic inflammation. It then usually gives rise to marked ascites, and the fluid returns repeatedly after tapping.

The **rapidity of growth** of broad ligament tumors depends somewhat on the character of the growth. Those of slow growth are usually simple cysts. The papillary cysts grow rapidly at the last, though the growth may be slow while confined within the broad ligament.

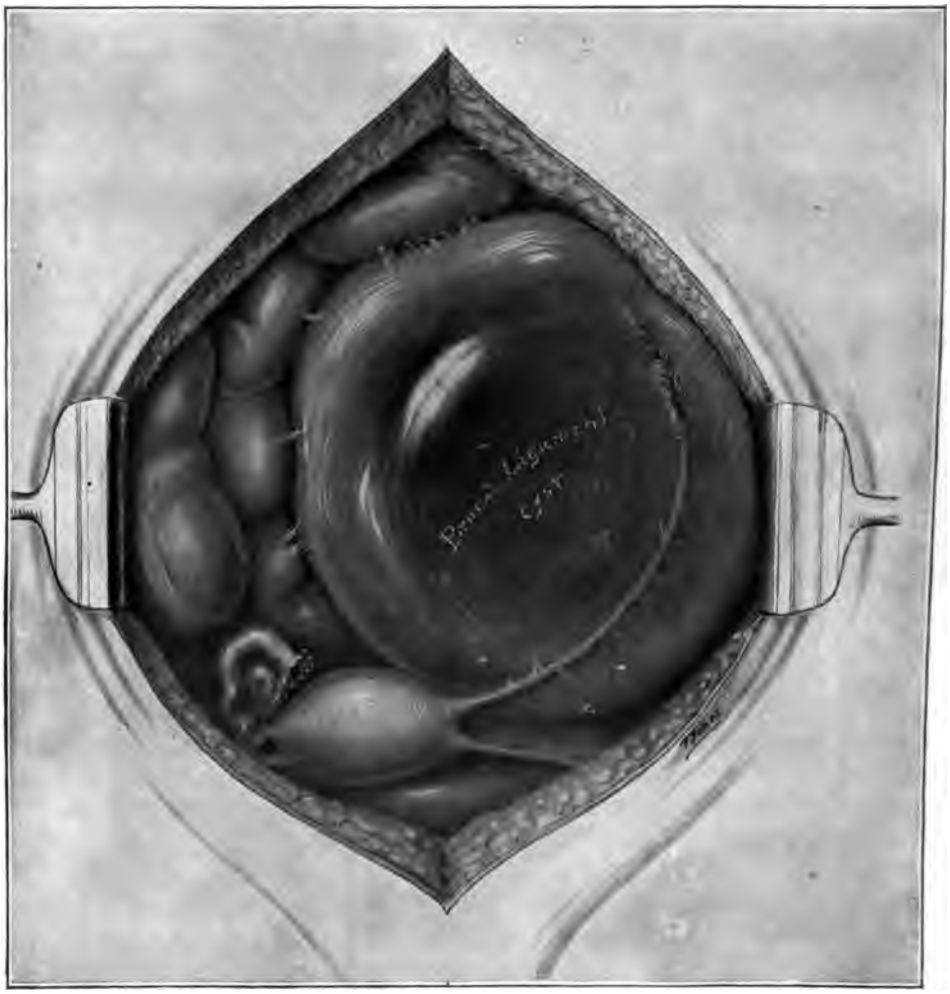

Fig. 700. Large Broad Ligament Cyst, showing the stretching of the Fallopian tube and the displacement of the uterus.

Treatment.

The treatment for broad ligament tumors is the same as for ovarian tumors—that is, removal by abdominal section. In some cases of simple cyst, very low in the pelvis, with the patient in bad condition, it is better to open the cyst from below, drain away the fluid and pack the cavity, keeping the wound open until the cavity is obliterated, the same as in the treatment of pelvic abscess. Some cases may be permanently cured in this way with much less danger than by abdominal section.

Ordinarily, however, the preferable operation is abdominal section. The operation for a parovarian cyst is somewhat more difficult than for an ovarian cyst owing to the fact that the parovarian growth lies between the layers of the broad ligament. This necessitates opening the broad ligament to extract the cyst and also necessitates careful closure of the remaining broad ligament cavity to prevent oozing or secondary hemorrhage.

CHAPTER XIII.

MALFORMATIONS.

Malformations are caused by errors in development. The growth of an organ may be simply arrested or it may grow in the wrong way. In either case there results a malformation. Most genital deformities are due to partial arrest of development. To understand these malformations, it is necessary to understand something about the development of the organs.

POINTS IN DEVELOPMENT.

The first structures indicative of the genito-urinary organs are the **Wolffian ducts**, which appear in the embryo at about the fifteenth day, and the **Wolffian bodies**, which appear the eighteenth day. These structures represent the future kidneys and genital apparatus. They lie on either side of the median line.

During the fourth week another duct appears near the Wolffian body of each side. These are the **Mullerian ducts.** The Wolffian ducts go to form the excretory ducts of the genital apparatus in the male. The Müllerian ducts go to form the excretory ducts of the genital apparatus in the female. A part of the Wolffian body of each side finally forms the genital gland of that side—i. e., the ovary in the female and the testicle in the male.

At the end of the first month the middle part of each Wolffian body shows thickening and proliferation, resulting in the formation of elevated bands called "genital ridges." These are the earliest traces of the genital glands. For a few days they remain indifferent. Very soon, however, a difference in the two sexes is noticed. The primitive female gland "possesses a large number of the primitive sexual cells and evidences a tendency of its elements to arrange themselves into groups, in which the large primitive ova become central figures." The primitive male gland, on the other hand, shows a tendency to the formation of a net-work of cell cords—the forerunners of the seminiferous tubules. "Microscopical examination of the sexual primitive glands even at the end of the fifth week is capable of distinguishing the future sex of the being." In a short time there is a difference in the gross appearance of the gland, with a difference in the arrangement of the ducts.

The parts played by the Wolffian ducts and Müllerian ducts differ in the two sexes. In the **female** the Müllerian ducts are the most important. The lower portions of the ducts of Müller become fused and form the vagina and uterus, and the upper portions remain separated and form the Fallopian tubes (Figs. 701, 702, 704). The lower end of the canal (future vagina) formed by the fused Müllerian tubes is closed at first. Later the lower part of the septum, which shuts off this canal from the urogenital sinus, breaks down, permitting the canal (vagina) to communicate with the urogenital sinus. If this septum fails to break down, imperforate hymen results (Figs. 226, 227).

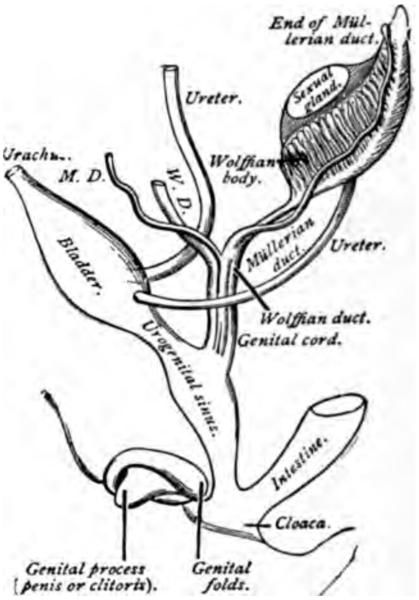

Fig. 701. Diagram Representing the Indifferent Stage in the Development of the Generative Organs. (Piersol, after Thompson—*American Text-book of Obstetrics.*)

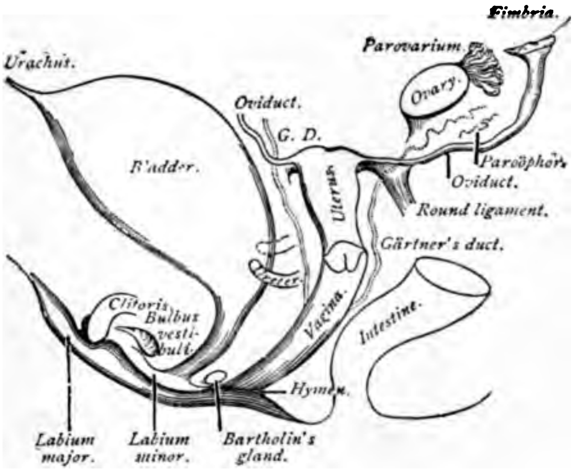

Fig. 702. Diagram Illustrating the Changes that take place in the Development of the Female Generative Organs. (Piersol, after Thompson—*American Text-book of Obstetrics.*)

The very end of the other extremity of the Müllerian duct is usually represented by a miniature cyst attached to one of the fimbrian and called the "hydatid of Morgagni" (Fig. 682).

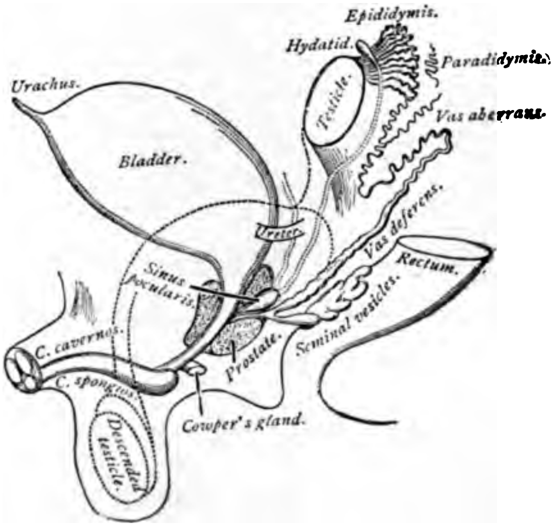

Fig. 703. Diagram Illustrating the Changes that Take Place in the Development of the Male Generative Organs. (Piersol, after Thompson—*American Text-book of Obstetrics.*)

The Wolffian body forms the ovary and also contributes the transverse tubules of the parovarium. The upper part of the Wolffian duct remains as the "head tube" of the parovarium (Fig. 682). The lower part of the Wolffian duct sometimes remains in whole or in part, and is then known as "Gärtner's duct" (Fig. 682). These parovarium tubules are all atrophic structures of but little importance. The ovary is the important organ formed from the Wolffian body in the female.

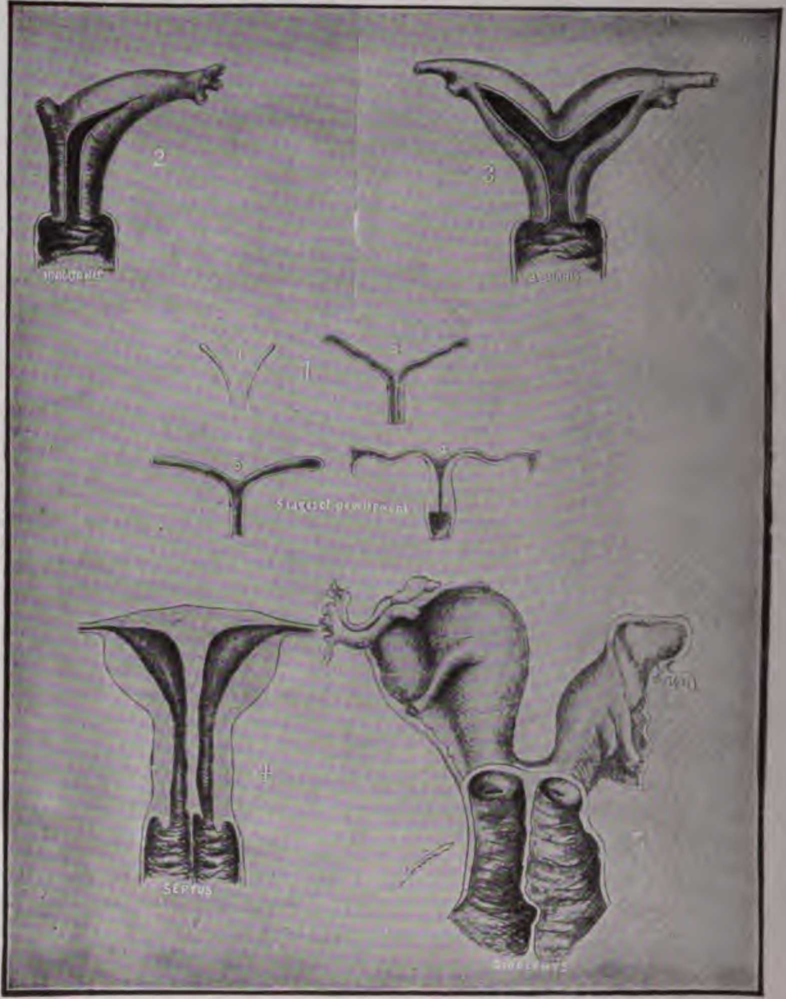

Fig. 704. Diagrammatic Representation of the Development and Malformations of the Uterus. 1, Showing the different stages in the union of the Müllerian ducts to form the uterus and vagina and Fallopian tubes. 2, Uterus unicornis. 3, Uterus bicornis. 4, Uterus septus. 5, Uterus duplex. (Gilliam—*Practical Gynecology*.)

In the **male** the Wolffian tubules and Wolffian duct contribute the important system of excretory tubes represented by the vas deferens and the epididymis, while the Müllerian duct is atrophic, its ends alone remaining. Its outer end forms the "hydatid of Morgagni," closely connected with the epididymis, and its inner end forms the "sinus pocularis," or "uterus masculinis," opening into the prostatic portion of the urethra (Figs. 701, 703).

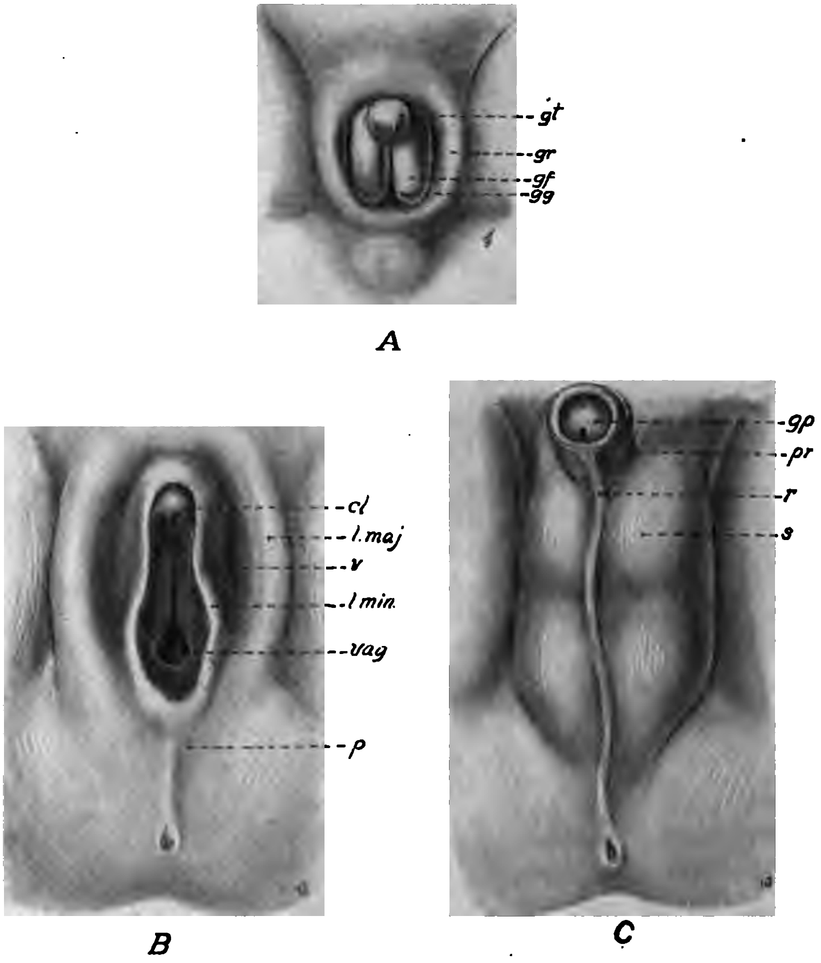

Fig. 705. Development of the External Genitals (after Ecker-Ziegler models). A, indifferent stage (eighth week); gt, genital tubercle; gr, genital ridge; gf, genital fold; gg, genital groove. B, female type; cl, clitoris; l. maj., labia majora; v, vestibule; l. min, labia minora; vag, vagina; p. perineum. C, male type; gp, glans penis; pr, prepuce; r, raphe; s, scrotum.

External Genitals (Fig. 705). "Until the ninth or tenth week the external genitalia afford no positive information as to sex"—they are indifferent. They then begin to differ and "usually by the end of the third month the external sexual organs are characteristic beyond doubt." Up to the sixth week the external opening of the intestine and of the **urinary apparatus** are received within a common cloacal recess whose recto-uro-genital orifice is surmounted by a small conical elevation, the "genital tubercle." The lower and posterior surface of the genital tubercle is divided by a furrow—the "genital groove"—bounded by thickened edges called the "genital folds." Gradually a septum develops, separating the rectal opening from the genito-urinary opening. The "genital tubercle" forms the **clitoris** and the "genital folds" form the **labia.**

The **vestibule** is formed by the cloaca or common opening of the intestinal tract and urinary tract in the early embryo. The **perineum,** developing, separates the rectum from this common vestibule. And the septum (hymen) closing the end of the rudimentary vagina (fused Müllerian ducts) breaks, allowing the vagina to open into the vestibule. This opening through the septum varies much in size, shape and situation, giving the various forms of opening found in the hymen (Fig. 209). It is usually small, and roughly crescentic in shape.

The **vagina** is formed by the fusion of the lower portions of the two Müllerian ducts and the absorption of the longitudinal septum between the cavities. The **uterus** is formed by the fusion of the middle portions of the two Müllerian ducts and the absorption of the septum between the cavities. The **Fallopian tube** of each side is formed by the upper portion of the Müllerian duct of that side. The **ovary** of each side is formed from a portion of the Wolffian body of that side. The **parovarium** consists of the "transverse tubules," which are formed from the Wolffian body, and the "head tube," which is formed from the Wolffian duct. The **paroophoron,** lying in the broad ligament near the parovarium, is the atrophic remains of the lower segment of the Wolffian body.

ANOMALIES OF DEVELOPMENT.

The more common anomalies of development are as follows:

1. The septum between the embryonic vagina and the sinus uro-genitalis may fail to break down, in which case there results **imperforate hymen** (Figs. 226, 227).

2. More rarely, perfect canalization does not take place in the fused Müllerian cords (each of which develops a central canal and becomes a Müllerian duct), resulting in a closed place at some point in the canal, giving **atresia of vagina** or atresia of cervix (Figs. 381, 390). In very rare cases all of the lower part of the fused cords fails of canalization, causing **absence of vagina** (Fig. 229).

3. The septum which normally separates the urinary tract (urethra) from the vagina may be defective, forming the anomaly known as **hypospadias.**

4. The septum between the two fused Müllerian ducts may persist all the way to the hymen, in which case there exists **double vagina** (Figs. 230, 231).

5. The septum may persist into the uterine portion of the Müllerian tract, forming a **uterus septus** (Fig. 704_4).

6. The middle portions of the Müllerian ducts may fail to fuse, giving a **double uterus** (uterus didelphys) (Fig. 104_5).

7. They may fuse only imperfectly, giving a uterus with **rudimentary horns.** There may be either two well-marked horns (uterus bicornis) (Fig. 704_3), or a fairly well-developed uterus with one rudimentary horn (Figs. 704_2, 409).

8. The Wolffian duct may persist to some extent, giving a duct lying alongside the vagina called **Gärtner's duct** (Figs. 681, 682). This may extend all the way along the vagina and open near the hymen, or there may be only remnants of the tube here and there. These remnants sometimes develop so as to form small vaginal cysts. Such cysts are situated in the vaginal wall along the course of the atrophic Wolffian duct.

The above are the principal gross developmental anomalies ordinarily met with. There are many other rarer anomalies, of which lack of space prevents mention. These vary in each organ all the way from slight modification to complete absence. The **ovary** is probably the least frequently affected by anomalies, and yet, as rare as they are, they have produced many surprises in abdominal work. I refer especially to the pregnancies following the supposed complete removal of both ovaries. This means of course that some ovarian tissue remains, and it is usually said to be a "third ovary." While the development of three normal ovaries is not impossible, the condition present in the cases under consideration is, as a rule, "lobulation" of the ovary of one or both sides, and not the presence of a complete third ovary. The lobulated ovary may show only a marked constriction, or it may be divided into two or three or many separate lobules, with considerable space between various lobules. Bovée mentions a case of his which the ovary of each side was represented simply by numerous small particles of ovarian tissue scattered over a large area of the posterior surface of the broad ligament, and resembling verrucal excrescences. It is evident that in such a case some outlying nodules of various tissue would almost certainly be missed, especially if obscured by an inflammatory exudate.

The malformations most commonly requiring treatment are:

Imperforate Hymen.
Atresia of Vagina.
Double Vagina.
Malformations of Uterus.
Pseudo-hermaphroditism.

IMPERFORATE HYMEN.

The origin of this malformation has just been explained. The condition causes no disturbance until puberty. After puberty there is a collection of menstrual blood back of the imperforate hymen. This gradually increases in amount and distends the vagina. If the obstruction is not relieved, there is gradual dilatation of the uterus (Fig. 227) and even of the Fallopian tubes (Fig. 228), forming a cystic mass, the contents of which is blood and the walls of which are formed by the vagina and uterus.

The **symptoms** are characteristic. At the age of puberty no menstruation appears, but about every four weeks the patient has a spell of feeling ill, with pain in the lower abdomen and the usual disturbances accompanying menstruation. The mother supposes that the girl is going to menstruate, but there is no flow. This is repeated month after month. As the collection of blood increases, the pain and disturbance become more marked, the patient's health begins to suffer, and a tender mass appears in the lower abdomen. Finally the patient becomes so sick that the physician makes a local examination. He finds that there is no vaginal opening (Fig. 226), but instead there is a fluctuating mass occupying the position of the vagina and uterus (Figs. 227, 228).

The **treatment** is crucial incision of the distended hymen, and, if the membrane is thick, excision of the most of it. The cavity above should be washed out with normal saline solution and then packed with sterile gauze. Great care is necessary to prevent infection. The decomposing blood that necessarily remains along the walls of the cavity favors the rapid growth of pus germs, and, though the operation is a simple one, patients have died from it, or rather from the infection following.

ATRESIA OF VAGINA.

The method of origin of this malformation has been explained. The condition may vary all the way from a thin septum blocking the canal to complete absence of the canal. The external genitals and hymen may be normal. On making the vaginal **examination**, an obstruction is met with at some point in the vagina. If there is a collection of menstrual blood back of the septum, fluctuation may be detected. Digital examination per rectum will give some idea of the extent of the atresia and the amount of blood behind it. If the patient is well past the age of puberty, and there is no fluid above the atresia, the probability is that the uterus is anomalous, so much so that menstruation could not come on even though the obstruction in the vagina were removed. So, before undertaking an operation for making a vaginal canal, recto-abdominal examination, under anesthesia if necessary, should be made to establish the size, shape and probable development of the uterus. In cases of apparent absence of the uterus, recto-vesical examination (see page 95) may be of assistance in locating a small nodule in the situation of the uterus.

The **treatment** depends on the circumstances of the case. If only a thin septum is present, it should be treated practically the same as an imperforate hymen—i. e., incised, to let out the blood, and then partially or wholly excised. If a considerable proportion or the whole of the vaginal canal is missing, the treatment requires extended operative measures according to the special conditions present. It may be necessary to build up nearly a whole new vagina.

Acquired Atresia. A considerable proportion of the cases of marked stenosis of the vagina, amounting almost to atresia, are acquired. Such a condition may result from injuries in childhood or inflammation, particularly the gonorrhoeal vaginitis of childhood, and severe inflammations following the exanthemata. Congenital syphilis also may cause the same, following severe ulceration. In later life, scar-tissue resulting from injuries in labor is the most frequent cause of narrowings in the canal and bands, and constrictions and distortions. Other causes in the adult are syphilitic ulceration, injuries and severe destructive inflammations. A pessary left in the vagina for several years may lead to such a result. In rare cases even complete atresia may result from some one of these causes. The atrophic vaginitis or "adhesive vaginitis" of old age (senile vaginitis) leads to adhesion of the walls of the vagina and stenosis and partial obliteration of the canal (see page 417). The treatment for acquired stenosis or atresia of the vagina is practically the same as for the congenital. The acquired form, however, is, when extensive, likely to be more difficult of satisfactory treatment on account of the large amount of scar-tissue in the vicinity.

DOUBLE VAGINA.

This consists usually simply in a longitudinal septum dividing the vagina into two canals (septate vagina). The vagina with entirely separate walls is a much rarer condition. The longitudinal septum is the persisting fused wall of the two Müllerian ducts, as already pointed out. It may extend the whole length of the vagina, giving two openings at the vestibule, and half the cervix in each upper end (Figs. 230, 231). On the other hand, it may consist simply in a septum extending part way. Even when the septum extends the full length of the vagina, one canal is usually so much smaller than the other and placed so far to one side that it does not interfere with coitus or pregnancy. In fact the opening of one canal may be so flattened out at the side of an apparently normal vaginal opening that it is not noticeable except on very close inspection. In such a case, however, when the slit beside the vaginal opening is noticed, further examination may reveal a rudimentary canal of considerable size, sometimes almost as large as the patulous one (see page 185). At the upper part of each vagina is one-half of the cervix. When labor takes place in a case of double vaginal canal, the septum is likely to be torn, partially or completely, converting the two canals into one. Portions of the septum may remain as a partial septum at the upper part of the vagina or as irregular bands and tags. I recall one case of septate vagina and uterus seen in the first pregnancy. The patient passed through labor without particular incident, except that the cervix (half cervix) was very slow in dilating. The lower part of the vaginal septum near the vaginal entrance was torn, but the greater part remained and seemed to occasion no trouble. Later, the patient returned to the hospital with gonorrhoea affecting the vaginal and uterine cavity of each side. Still later, I was obliged to curet both uterine cavities.

The treatment of double vagina is simple. If the septum is causing any obstruction or disturbance, it is divided or, better still, largely excised, so that the two vaginal canals are converted into one.

MALFORMATIONS OF THE UTERUS.

Double Uterus. The malformation may consist of simply a partial or complete septum in an otherwise normal uterus (uterus septate, Figs. 704_4, 372), or a rudimentary horn with a nearly normal uterus (Fig. 409), or a uterus with a body divided into two horns (uterus bicornis, Fig. 704_3), or a double uterus, with the body and cervix of one side separate from the body and cervix of the other side (uterus didelphys, Fig. 704_5), or a "unicorn uterus"—i. e., uterus made up of the Müllerian duct of one side only, the other being absent or nearly so (Fig. 704_2). The most severe grades of deformity are very rare, though they are to be thought of in the diagnosis in puzzling cases. A septum in an otherwise normal uterus is discovered only by intra-uterine manipulation, such as curetment or the introduction of the hand after labor for the removal of adherent placenta or for other reason.

No treatment for double uterus is required ordinarily, with the exception of the precaution, when curetting the uterus, to be certain that both cavities are clear. It is appreciated, of course, that in this connection, and also in double uterus, pregnancy may take place in each of the two cavities, and at different times, producing various surprising results.

Rudimentary Horn. The uterine malformation of most practical interest is that of a rudimentary horn with an otherwise nearly normal uterus. This is not so very infrequent and many are the diagnostic difficulties that result therefrom. Such a rudimentary horn extends outward from the main body of the uterus, and receives at its outer extremity the attachment of the Fallopian tube and round ligament of that side. The point of attachment of the round ligament is, in some cases, the only decisive gross evidence as to whether the mass in question is an enlarged Fallopian tube or a rudimentary horn of the uterus. The cavity of the rudimentary horn may be complete, extending all the way from the Fallopian tube to the main cavity of the uterus, or it may be only partial, being absent at some part (Fig. 409), or the cavity may be entirely absent, the horn existing merely as a musculo-fibrous cord connecting the Fallopian tube and round ligament with the uterus. Most of the trouble resulting from a rudimentary horn comes from infection in it or pregnancy in it (Figs. 408, 409).

The symptoms and differential diagnosis and treatment are the same as for similar affections of the Fallopian tube, with the following special points:

1. The mass is usually connected to the uterus by a much broader attachment.
2. There is more enlargement of the uterus and distortion of its cavity.
3. The mass may become much larger without rupture (if pregnant) or without adhesions (if inflammatory).
4. There may be a communication with the main uterine cavity. In most

cases the condition is not thought of until found during the course of an operation for what was supposed to be some one of the more common affections. Even when thought of, a diagnosis is rarely possible (except in an examination under anesthesia), for it produces the symptoms and signs of more common conditions, and the trouble is naturally supposed to be some one of these more common affections. In some cases, however, there are anomalous symptoms or signs that make diagnosis difficult and doubtful, and arouse suspicion of this malformation. Sometimes there is decided resemblance to a fibroid. I recall one such case. The symptoms and signs were anomalous and puzzling. I made a diagnosis of probable fibroid with complications. Operation revealed a rudimentary uterine horn, with the remains of an early pregnancy in it. There was no fibroid.

PSEUDO-HERMAPHRODITISM.

A true **hermaphrodite** is, according to Ahfeld's definition, "an individual with functionating active glands of both sexes, provided with excretory ducts." No such case has been reported in which the diagnosis has been fully accepted, though there is considerable dispute among authorities concerning some. Several cases have been recorded in which, among other anomalies, there were glands that on microscopic examination presented some of the characteristics of both ovary and testicle. But that condition does not constitute a double set of glands and excretory ducts.

A **pseudo-hermaphrodite** is an individual of one sex presenting some of the local characteristics of the other sex. Many such cases have been recorded and not a few of them have presented a most difficult problem in regard to the diagnosis of the sex. The individual himself (or herself, as the case may be) does not seem to be able to help much in determining the real sex in the most difficult cases. Neugebauer was able to collect 942 cases of pseudo-hermaphroditism. In at least 41 of the pseudo-hermaphrodites the true sex was positively determined only after abdominal section, though in only four cases was the operation undertaken specifically for diagnostic purposes. Numerous cases are recorded where the individual dressed and lived for many years as a man or as a woman, and then ascertained that the real sex was the opposite one. The most celebrated case, perhaps, is that of Carl Hohmann, a masculine pseudo-hermaphrodite, who from infancy to the age of forty-six years was considered a female and lived as such. The true sex being then ascertained, he assumed male attire and married as a man. The space available is not sufficient to permit the subject of pseudo-hermaphoditism to be taken up in an extended way. It is sufficient to mention some of the more practical points.

When a child presents any anomaly of the genital organs, a most careful examination should be made and all the possibilities considered, in order to determine positively the real sex. Steps in the development of the external genitals are shown in Fig. 705. Most of the pseudo-hermaphrodites are really males (have testicles in the abdomen or scrotum), the resemblance to the female external genitals being due to some form of hypospadias accompanied with an abnormal opening or pocket that is mistaken for a vagina (Figs. 706, 707). The principal anomaly in female pseudo-hermaphrodites, that causes some resemblance to the male sexual organs, is hypertrophy of the clitoris (Fig. 269), accompanied with adhesion of the labia minora or labia majora over the vaginal opening (Fig. 225), or with imperforate hymen (Fig. 226), or with labial hernia (Fig. 281), or hydrocele or other labial swelling covering the vestibule.

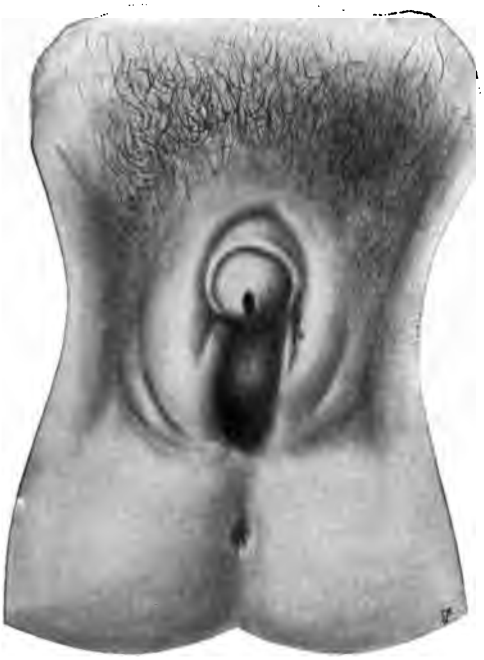

Fig. 706. Male Pseudo-hermaphroditism. The appearance of the external genitals in marked hypospadias.

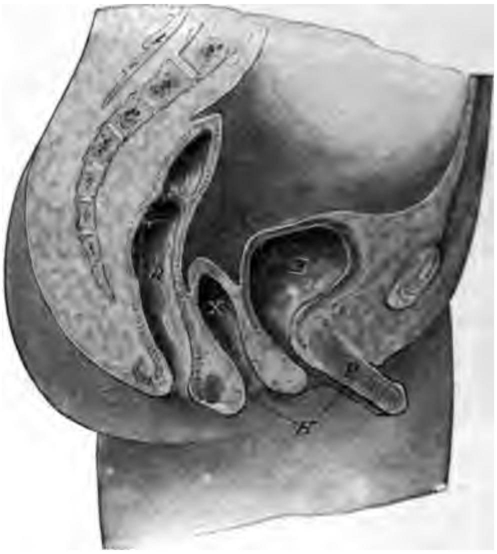

Fig. 707. A section explanatory of Fig. 706. B, bladder; R, rectum; P, penis with lower urethral wall absent; H, abnormal condition constituting hypospadias and requiring a careful examination to determine the sex of the child; X, sinus pocularis, enlarged and opening on perineum, and consequently likely to be mistaken in the new-born for a vagina.

In some cases the positive determination of the sex is very difficult and may even be impossible except by abdominal section. The general rule in cases of doubt is to class the pseudo-hermaphrodite as a male until unmistakable evidence of the opposite sex appears. This will avoid a mistake in the great majority of instances. In the case of four supposed female pseudo-hermaphrodites who were subjected to abdominal section, three of them proved to be males.

CHAPTER XIV.

DISTURBANCES OF FUNCTION.

I shall consider here not only those disturbances which we designate as "functional" because no organic lesion is apparent, but also those disturbances of function due to various organic diseases—that is, I shall consider all "disturbances of function," whether accompanied by evident organic disease or not. These conditions are, of course, only symptoms. They are not diseases and must not be taken to constitute a diagnosis. They are only indications of some disease, and the physician must determine the nature of that disease by further investigation.

The subjects will be taken up as follows:

Disturbances of Menstruation.

- Points in Physiology (Normal Menstruation).
- Absence of Menstruation (Amenorrhoea).
- Scanty Menstruation.
- Excessive Menstruation (Menorrhagia).
- Painful Menstruation (Dysmenorrhoea).
- Irregular Menstruation.
- Precocious Menstruation.
- Vicarious Menstruation.

Disturbances of Sexual Intercourse.

- Dyspareunia.
- Sexual Impotence.

Disturbances of Child-bearing.

- Sterility.

Discharge from the Genitals.

- Leucorrhoea.
- Bloody Discharge.

POINTS IN PHYSIOLOGY (NORMAL MENSTRUATION).

As a prelude to the menstrual disturbances proper, it is well to call attention to some points in the physiology of normal menstruation.

Menstruation is the regular periodic discharge of blood from the uterus, recurring about every four weeks from puberty to the menopause, except during pregnancy and lactation. This definition, however, does not express all there is of menstruation. The menstrual flow is simply the outward sign of important internal changes, and we must inquire what these internal changes are and what they mean in the life of the woman.

In dealing with this subject there must be taken into consideration the following three phenomena:

Puberty and the beginning of menstruation.

Menstruation when fully established.

The menopause or "change of life."

1. Puberty and the Beginning of Menstruation. Puberty is the period at which the girl matures and becomes capable of child-bearing. This period is marked by a very rapid development of the sexual organs. The ovaries, uterus, vagina and external genitals enlarge, hair appears in the pubic region and in the axillae, the breasts become more prominent, the pelvis enlarges and the whole body becomes somewhat larger and its outlines more rounded and graceful. These physical changes are accompanied by mental changes, which are indicated by modesty, sexual desire and allied phenomena.

These changes take place usually between the eleventh and sixteenth years. When the proper development has been reached, the menstrual flow appears. This flow is the sign that development has taken place and that ovulation has begun. Ovulation, no doubt, occurs before menstruation appears, sometimes long before, but, as the menstrual flow is the outward sign of the internal sexual preparation, the period of sexual activity is counted as beginning with the first menstrual flow.

The age at which the first menstruation appears varies in different races and under different environment. Climate has long been thought to influence the beginning of menstruation—the colder the climate the later the first menstruation. This holds good as a general rule, the Laplander beginning to menstruate at about 18, while the inhabitant of hot climates at from 9 to 11. Englemann has shown, however, that in some of the most northerly tribes menstruation appears as early as in the tropics. The mode of life has some influence, as has also the general health of the girl. Girls raised in the city begin to menstruate earlier, usually, than those raised in the country. In addition there are the personal inherited tendencies, about which we know very little, but which exercises a marked influence on the phenomena of life.

Occasionally the beginning of menstruation is long delayed without any apparent cause. Hirst had a patient who menstruated for the first time at the age of 33, had four periods in the next two years, and then conceived two months later. He records also a reported case of a woman, married at 34, who menstruated for the first time at the age of 45, and bore a child at 46.

In the United States a girl is expected to begin to menstruate when she is twelve or thirteen or fourteen. Not infrequently the menstrual flow begins at the age of ten or eleven, and hence when a girl reaches about the age of ten her mother should explain to her that a slight bloody flow may be expected and that it is nothing that need frighten or worry her, but entirely natural.

The period of puberty is sacred to the physical development of the girl. During these years (i. e., from the age of 10 to that of 16) she should live in a free and healthful way—plenty of fresh air and outdoor exercise, with proper rest at menstrual periods, an abundance of plain nourishing food, regular hours of sleep, only a moderate amount of school work and other mental training—in short, a regimen that favors free physical development, unhampered by exhausting mental work or by indolent habits. Some of the distressing disturbances, pelvic and otherwise, that appear later in life are due to, or increased by, neglect at this developmental period. Girls are permitted to rise late and sit around the house, doing little else than read, when they should be at some healthful physical work (house-work, outdoor exercise, etc.), or, on the other hand, they are given exhausting school studies, immoderate piano practice, and other acquisitions of modern life that keep the body too much indoors and in one posture, and that develop mental activity at the expense of physical strength.

2. **Ordinary Menstruation.** The phenomenon is known under a variety of names—for example, "menses," "monthly sickness," "monthly period," "monthlies," "periods," "regular sickness," "catamenia." Patients usually refer to their menstruation as the time when they were "unwell."

The menstrual flow is accompanied by certain changes in the endometrium, already described (page 528). These consist principally of engorgement and swelling of the endometrium, hemorrhagic infiltration and the casting off of cells over small areas. Gebhard has demonstrated conclusively that there is no wholesale destruction of the endometrium, as was formerly taught. There are also some changes in the general assimilative and excretory processes of the body. The amount of urea excreted is diminished, the appetite is poor, and there is usually more or less aching and lassitude.

The menstrual discharge consists of blood mixed with secretion and epithelium from the uterus and with epithelium from the vagina. This admixture with mucus and epithelium takes place to such an extent by the time the vagina is reached that the blood does not clot. It is dark and rather viscid or stringy from its admixture with cervical mucus. The menstrual discharge has also some odor, due to slight decomposition, which takes place during its passage through the vagina. Menstrual blood taken directly from the interior of the uterus has no odor and it clots like ordinary blood.

The amount of blood lost at each menstruation varies greatly in different individuals, the usual amount being probably from five to ten ounces. The rate of flow—i. e., whether or not the flow is too free—is estimated usually by the frequency with which the napkins have to be changed. The usual flow requires a change about three times daily during the height of the menstruation. If more frequent changing is necessary, the flow is too free.

There is considerable variation in the duration of the menstrual flow, the average being three to four days. Some perfectly healthy women, however, menstruate only one or two days and others six to seven days. The scanty menstruation or the profuse menstruation, as the case may be, seems to be normal for that particular individual. The duration of the flow in the same individual is usually about the same at the different periods.

The periodicity of the flow is more uniform, the flow recurring about every 28 days. However, many healthy women menstruate at periods somewhat longer or shorter than this. In one series the duration from beginning to beginning was 28 days in 70 per cent of the cases, 30 days in 13.7 per cent, 27 days in 1.4 per cent, and 21 days in 1.6 per cent (Krieger).

Menstruation ceases during pregnancy and lactation. Exceptions to this rule are frequent. A few women menstruate for one or two periods after conception, and very often the menses return while a woman is still nursing her child.

The principal physiological significance of menstruation is that it is a preparation of the uterus for the reception of a fertilized ovum. As to the exact significance of each step in the menstrual process, and as to whether it has to do with other important functions (eliminative), there is still much dispute. The old conception of menstruation as a general cleansing process has long since disappeared, but recently some interesting arguments have been put forth to show that menstruation assists in the elimination of the supposed ovarian "internal secretion."

The hygiene of the menstrual period is the same as the hygiene of any other period, except that there should be a little less physical and mental strain. Even when menstruation is perfectly normal, there is usually some feeling of general discomfort and a disinclination to extra physical or mental exertion, and this feeling should be favored in so far as it does not interfere with the general healthful routine of life. Exercise, tepid bathing, an abundance of sleep, regular meals and nourishing food are all as necessary at this time as at any other.

3. **Menopause.** In a healthy woman menstruation ceases at the age of 44 to 47. There is considerable variation in this respect, the menses sometimes ceasing three or four years before that age or continuing three or four years afterward. It is very exceptional, however, for menstruation to cease before forty or to continue after fifty. This period of cessation of menstruation is known variously as the "menopause," the "climacteric," and the "change of life." The changes that take place in the uterus during and after the menopause have already been described (page 528). They are similar to those occurring in all the genital structures—namely, a gradual atrophy of the functionating part (endometrium and muscular tissue), a general fibrous change and a slow, but decided, diminution in size.

The menses usually cease gradually—that is, the flow may be less free or may continue a shorter time than usual, or the flow may be missed entirely for one or two periods. This partial and irregular absence of the menstrual flow may continue for one or two or three years before it ceases entirely. This gradual diminution of the menstrual flow is natural and there are frequently slight nervous disturbances ("hot flashes," etc.) that can hardly be classed as pathological. But many of the symptoms that are ordinarily considered as part of the "change of life" are really not so—for example, increased menstrual flow, bloody discharge between the menstrual periods, leucorrhoea, pelvic pain, and marked nervous disturbances. These are due to pathological conditions. They mean that something is wrong, and they require investigation, that the trouble may be remedied. This is important especially in the case of vaginal discharge, whether bloody or leucorrhoeal. It seems to be the general impression among women that irregular bloody discharges are natural during the "change of life." But such discharges are not natural—they usually mean either inflammation or cancer. One of the saddest things in gynecological work is that a large proportion of the cases of cancer of the uterus are beyond the possibility of a cure when first examined. In such a case it is supposed by the patient and her friends that the slight bloody discharge which at first appears is "natural to the change of life," and so no attention is paid to it. Later, too late, they find that it is due to serious disease, which, because of neglect, has progressed to such an extent that it is beyond cure.

ABSENCE OF MENSTRUATION (AMENORRHOEA).

Amenorrhoea is the absence of menstruation for one or more periods between puberty and the menopause. You will notice that the definition includes the absence of the menses from pregnancy and lactation. This is known as "physiological amenorrhoea."

Pregnancy must always be taken into consideration in a case of amenorrhoea, and before the amenorrhoea is attributed to any other cause pregnancy must be eliminated—by the circumstances of the case or by questioning the patient or by an examination.

Amenorrhoea from other causes is found principally in girls and young women in whom the function of menstruation has not yet been completely established. The age of puberty—i. e., the beginning of menstruation—varies within normal limits considerably. Girls begin to menstruate, as a rule, at the age of twelve or thirteen or fourteen. The beginning of menstruation may be postponed until the age of 16 or 17 without disturbance. Usually, however, after the age of 16, and often before that, if the menstrual flow does not appear, there are disturbances that indicate some departure from normal health, and the patient may be said to have amenorrhoea.

Amenorrhoea is not a disease, but only a symptom. It may be an indication of any one of several entirely distinct conditions, just as a cough may be an indication of laryngitis or bronchitis, or pneumonia or tuberculosis. When a patient comes complaining that she does not menstruate, the first thing to do is to determine **why** she does not menstruate—i. e., what disease or condition lies back of this symptom.

In practice it is convenient, for purposes of diagnosis and treatment, to divide the cases of amenorrhoea into two classes—one class including those patients who have never menstruated and the other class including those who have.

(A.) WHEN THE PATIENT HAS NEVER MENSTRUATED.

A mother brings her daughter, aged 15 or 16 or perhaps 18, to you, stating that the girl has never come unwell. The mother is anxious to know why the girl does not come unwell and, of course, what should be done for her.

Causes.

In such a case the absence of menstruation may be due to one of three causes, as follows:

1. Poor general health, with pronounced anemia.
2. Some obstruction in the genital canal.
3. Imperfect development of the uterus.

Which of the causes is present in this particular patient? That you must find out by investigation, and the first step in that investigation is to determine the state of the patient's general health. Is she pale, weak, lacking in vigor, always tired, easily exhausted by light work? If so, the amenorrhoea is probably due to the first cause mentioned.

1. Poor General Health, with Pronounced Anemia. The next step is to search carefully for the cause of the poor vitality, with its resulting anemia. The mother usually thinks the poor health is due to the absence of the menses, while the fact is that the absence of the menses is due to the poor health, and the poor health is due to some general or local disease, the nature of which it is your province to ascertain.

Now, it would be out of place here to attempt to take up in detail the differential diagnosis of all the diseases which may cause deterioration of the general health, with marked anemia and amenorrhoea. All I can do is simply to point out some of the common causes.

a. Tuberculosis is a very frequent cause of amenorrhoea. It may appear in the form of tuberculosis of the lungs, or of the intestines or of the peritoneum, or of the glands or of the bones, or of the urinary organs—any of the various forms of tuberculosis. The proper questions must be asked to elicit the information necessary to establish the presence or absence of this disease.

b. Malaria, particularly in the chronic form, is a frequent cause of anemia in malarial regions.

c. Acute disease, such as typhoid fever, pneumonia, diphtheria, and the exanthemata occurring at puberty, may weaken the patient so much as to delay the beginning of menstruation for many months.

d. Heart disease following rheumatism in childhood may cause persistent and severe disturbances of nutrition.

e. Digestive disturbances or kidney lesion, or diseases of the nervous system, may cause a depression of vitality to such an extent that the patient does not menstruate.

f. Confinement indoors, exhausting studies, overwork, poor food, lack of exercise—any of these things may cause anemia with amenorrhoea.

g. Chlorosis. In some cases we can find no definite local or general disease to account for the blood condition—the pronounced anemia. In this class come the cases of chlorosis, and of pernicious anemia and of the other so-called "primary" anemias. The differential diagnosis of these forms of anemia belongs to general medicine, and the diagnostic points are described under diseases of the blood. Chlorosis occurs so frequently in girls and young women that it is sometimes classed as a gynecological affection, but it belongs to general medicine the same as the other blood diseases.

Suppose, however, that our patient is not anemic, but is rosy, robust and apparently in good general health. What then causes the anemia?

2. It may be due to some **obstruction in the genital canal.** The obstruction is due to some malformation, such as imperforate hymen, or atresia of vagina or atresia of cervix uteri. These malformations are rare, the most frequent being imperforate hymen (page 841).

Obstruction in the genital canal gives rise to no symptoms until puberty is reached. At the age of 13 or 14 or later the patient begins to feel very bad each month. At intervals of about four weeks she notices marked lassitude and loss of appetite, feels somewhat feverish and out of sorts, has pain in various parts of the body, more particularly in the back and lower abdoment. She complains just as a woman does when she is about to be unwell. Her mother thinks she is coming unwell, but no flow appears. After a few days the pain and other disturbing symptoms subside and she feels fairly well until the next month.

After several months the pain and accompanying disturbances last longer—in fact, may become almost continuous—and the patient's general health begins to suffer. A swelling may appear in the lower abdomen or at the vaginal entrance.

Such a history makes a local examination imperative. In the local examination, if the condition be imperforate hymen, the vaginal entrance is found closed. There may be a bulging of the hymen due to the pressure of menstrual blood behind it. If the atresia is situated high in the vagina, the vaginal entrance is found open, but after the examining finger has been introduced for a short distance it meets an obstruction, consisting of a wall of tissue blocking the vagina. If there is a collection of menstrual blood behind the obstruction fluctuation may be obtained. Digital examination by the rectum will give additional information as to the location and length of the vaginal atresia and as to the amount of menstrual fluid collected behind it. In long-standing cases the vagina and uterus and even the Fallopian tubes may be distended with blood.

In cases of atresia of the vagina there are very liable to be other malformations higher, and sometimes the uterus is entirely absent. If the patient is past the age of puberty and no collection of blood is found above the vaginal atresia, the strong probability is that the uterus and appendages are either absent or so poorly developed that menstruation would be impossible even though the vaginal obstruction were removed. Careful examination should be made to determine certainly whether or not the uterus is present.

But suppose the girl is healthy—good color, good general health, and no local malformation—what then causes the amenorrhoea?

3. It may be due to **imperfect development of the uterus.** This poor develment of the uterus may be simply part of a general under-development, or it may be limited to the uterus and appendages, the patient being otherwise strong and fully developed.

In some cases the imperfect development is so marked that it can be proven by examination (body of uterus very small). In other cases the imperfection is less marked—the uterus and appendages are apparently normal, as far as can be determined by ordinary bimanual palpation, and still the development has stopped short of perfection, as is shown by the fact that the patient does not menstruate and that treatment directed toward stimulating development brings on the menstrual flow.

Treatment.

The patients now under consideration are girls and young women who have never menstruated. If there are no marked local symptoms pointing to obstruction, the first step in treatment is to put the patient in the best possible general health. A local examination is not indicated at first in the absence of local symptoms. The anemia should be corrected, and the general health improved and the normal function stimulated by the following measures:

1. The long continued **administration of iron,** accompanied by arsenic or strychnia or other tonics, as indicated by the conditions present.

2. **Curtail exhausting school duties,** immoderate piano practice and other acquisitions of modern life that keep the body too much indoors and in one posture, and that develop mental activity at the expense of physical strength.

The mind should be trained of course, but it should be trained in a way that does not interfere with the development of the body. The age of puberty is sacred to the physical development of the girl and nothing should be allowed to interfere with it.

A step in the right direction is the introduction of regular gymnastic exercises in the curriculum of the public schools. This needs to be extended and combined with a certain amount of outdoor exercises.

The course of study in the public schools should be under such medical supervision that the pupils be not unduly taxed, and when it is seen that a girl is not doing well physically, her parents should be advised to take her out for a time and let her live the outdoor life that she needs. Such a step in time would turn many a girl from the path of imperfect development and lifelong invalidism, and cause her to become a healthy, robust and useful woman—an ornament to society and a blessing to all around her.

3. Regular and Moderate Exercise. There are excellent general works on the various forms of exercise, and I would advise a study of this subject, for, in many affections, well-directed exercise is one of our best remedies. I will here speak of only a few points.

a. Take five to ten minutes' exercise with a Whitely exerciser, or other good exerciser, each night after the clothing is loosened for retiring. The exercise should be taken regularly—every night without fail. It should be moderate at first, not more than five minutes, and the time lengthened as the patient becomes used to it. It should not be violent. Begin with correct standing and walking and then pass to the arm movements and the movements that involve the chest muscles, the expansion of the chest, etc. As the patient gets used to the work and can extend the time, other movements may be taken up, movements involving the abdominal and back muscles and the muscles of the hips and lower extremities. I think it is a good plan, however, to always take the arm movements, either at the beginning or end of each exercise period.

b. Take a walk of 5 to 10 blocks (¼ to ½ mile) each day. It is best to have a regular time for this. This exercise should be regular and moderate, and deep breathing should be remembered (a deep breath every 8 to 10 inspirations) and correct easy position in standing and walking.

With this as with the indoor gymnastic exercise, it is not the length or amount of exercise so much as the regularity of it that accomplishes the desired result.

c. Other forms of outdoor activity, such as horseback riding, driving, rowing and the various outdoor sports, are excellent, as they keep the patient out in the open air and sunshine and at the same time necessitate considerable muscular activity. They are particularly invigorating because they add to the necessary exercise a healthful interest and anticipation and enjoyment But these things should not be allowed to interfere with the regular walk and gymnastic exercise—in fact, at the first regular gymnastic exercise and walk will probably be all the patient can take without fatigue, and it is only after these have been practiced for a time that the more active out-of-door sports can be undertaken without harmful fatigue. These latter are to be taken only in addition to the other when the patient is ready, and not in place of them.

4. Regular Meals and Suitable Food. An abundance of good nourishing food should be taken at regular intervals. At first the patient's appetite will probably be capricious and she will not care for much substantial food. Do not try to stuff her and do not tell her she must eat a great deal of this or that article of food, of which even the thought perhaps destroys what little appetite she has. Rather give the exercise that will after a time give her an appetite, and, after she gets so she is really hungry, tell her what article of diet she can not have, leaving her to find her food from the other articles or go hungry. Thus by giving her an appetite and cutting off the unwholesome articles with which she has perhaps been accustomed to pamper herself, she will soon be taking an abundance of good substantial food and be glad to get it. The result will be good blood, strong muscles, sound sleep, graceful carriage, healthy color, clear mind, sweet temper and a general attractiveness which can never be supplied by cosmetics and indolent luxury.

5. After the patient is well started on this regimen, say after one or two months, she may be given some of the **emmenagogue preparations,** provided the menstruation has not already begun. In some cases as soon as the patient is put in good general health the menstruation begins normally. In other cases the menstruation does not appear, even when the patient has been restored to apparently good general health.

In such a case the tonic regimen is continued and in addition some emmenagogue preparation is given, such as manganese dioxide, apiol, or some of the other preparations mentioned under Formulae.

If after two or three months of this treatment the menstrual flow does not appear, or at any time if marked local symptoms develop, make a vaginol and bimanual examination and determine if there is any obstruction to the flow or any other pathological lesion needing correction.

If an obstruction (imperforate hymen or atresia of vagina) is found, it must be treated as described elsewhere under the organic lesion.

If no obstruction is found and the organs are apparently normal, it is then to be assumed that the trouble is due to imperfect development of the uterus—that is, that the organ has stopped short of perfection. We then employ measures to stimulate the uterus to functional activity.

The tonics, the exercise, the emmenagogues and the other measures mentioned tend in that direction. One of the local measures frequently used for stimulating a poorly developed uterus is electricity in its various forms, both galvanic and faradic.

If the symptoms recur at regular intervals, indicating that that is the time that the menstrual flow is nearly taking place, use hot sitz baths, hot foot baths, and warm applications to the lower abdomen.

The propriety of intra-vaginal measures depends somewhat on the patient. In some patients the vaginal opening is large and the patient is not particularly nervous, and local treatment may be carried out without special trouble. In such a case applications of silver nitrate solution (4% to 10%) to the cervix may be made every other day at the time when the precursory symptoms of menstruation appear. The hot douche also may be used two or three times daily. If these are still ineffective, vagino-abdominal applications of electricity may be tried.

In the case of a patient who is nervous and distressed by the local treatment, and particularly if the vaginal opening is very small, no intra-vaginal treatment should be employed without anesthesia, except the introduction of the small vaginal electrode or the giving of hot vaginal douches. In such a case no intra-uterine treatment is used unless there is some indication for giving the patient an anesthetic.

It may be that an anesthetic is required to make a careful examination to determine whether or not there is any serious abnormality of the organs. In such a case it is well to have instruments ready for dilating the cervix, as that seems to act as a stimulant to menstruation in these cases. In some cases curetment is indicated as a local stimulant.

Occasionally there is anteflexion with atrophic endometritis, and, if that condition be present, the uterus had best be curetted at the same time that the cervix is dilated. During this treatment under anaesthesia the vaginal entrance and cervix uteri should be well dilated, so that an intra-urine electrode may be used later, if necessary.

In a case of amenorrhoea where the girl is engaged to be married, the question of the propriety of marriage sometimes comes up—the parents or the patient desiring to know whether it would be right for her to marry when she has never menstruated. The answer is, that if there is no organic lesion, which in itself is a bar to marriage, marriage is perfectly proper, just the same as though the girl were menstruating regularly. In such a case the absence of menstruation is simply a functional disturbance, which will probably soon disappear under the influence of a happy married life.

(B.) WHEN THE PATIENT HAS MENSTRUATED.

When the patient has menstruated one or more times, the absence of menstruation is due to one of the following causes:

Causes.

1. Some condition connected with pregnancy.
2. Some other form of physiological amenorrhoea.
3. Poor general health, with anemia.
4. Acute general disease.
5. Local (pelvic) disease.
6. Operative removal of essential structures.
7. Obesity.
8. Nervous impressions.
9. Suppression of menses.

1. Pregnancy. a. Normal Pregnancy.—If the patient has previously been regular in menstruation, is in good health and has had an opportunity to become pregnant, the natural supposition is that she is pregnant, and until it is proven that she is not pregnant, nothing should be done that could in any way interfere with pregnancy.

The patient may assert positively that she is not pregnant, may even deny any possibility of pregnancy, but when after examination there is any suspicion in your mind, postpone all local treatment until after the next menstrual flow. If you doubt the patient's honesty—that is, if you think she may return and tell you that she menstruated when in fact she did not—tell her that she must come during the flow, that you may determine the character of the flow. In this way you can establish certainly whether or not she really menstruates.

In this matter of the **question of pregnancy** it requires considerable judgment and tact to, on the one hand, detect the cases of pregnancy, and, on the other hand, avoid wounding the feelings of innocent persons by ill-advised questions. Concerning the question of pregnancy, the cases may be divided into three classes. In the first class come the girls and unmarried women in which, from the character of the trouble or from the known character of the patient, the possibility of pregnancy may be at once eliminated. These correspond very closely with the patients who have never menstruated and require the same treatment.

In the second class come the married women. In these an examination may be made at once and the diagnosis of pregnancy settled thus. If the diagnosis is still doubtful after examination, the patient is told that it is too early yet to be certain about it and she is directed to come again after a month or six weeks.

In the third class come the girls and unmarried women about whom you know but little—they may be all right or they may be all wrong; you simply do not know and hence must be cautious. In this class come also widows, divorced persons, women living apart from their husbands—all of whom, if pregnant, might wish to conceal the fact. Some of these patients are perfectly truthful with the physician, telling him their fears or leaving a clear opening for the asking of questions that would bring out the information. In other cases the patient gives the whole history of her case without any intimation of a misstep. Occasionally the patient tries deliberately to deceive the physician, hoping that in his examination or treatment something may be done that will bring about an abortion.

In such uncertain cases it is usually best for the physician to keep his thoughts to himself, and not to intimate any suspicion of pregnancy until some good evidence of it is found. Do not depend too much upon the history the patient gives. Just keep in mind that it may be all truth and it may be all falsehood. If the patient is a girl or unmarried woman, an examination need not be made at once. She may be placed on tonic treatment that will not interfere with pregnancy. This will put her in better condition for menstruation and in the meantime the case may be observed and developments watched for. If after several weeks menstruation does not appear, an examination may be suggested. If the patient was formerly married, or has taken local treatment or has had an examination made, an examination may be advisable at once. If the examination signs are not decisive either way, the patient may be kept on tonic treatment and another examination made after several weeks.

In this way the physician protects himself and at the same time gives the patient good treatment. If it turns out that no pregnancy is present, the patient need never know that pregnancy was suspected. On the other hand, if it turns out that pregnancy is present, nothing has been done that could possibly interfere with it. He has done what was right for the patient and has protected himself, and accordingly prevented the patient from making a fool of him, as some of the deluded "smart" ones try to do.

b. Extra-uterine Pregnancy.—The evidences of tubal pregnancy have already been given (page 773).

1. **Other Forms of Physiological Amenorrhoea.** a. Lactation.—As a rule, a woman does not menstruate while nursing a baby. There are, however, many exceptions to this rule, especially after the first six months. Quite frequently a patient, while nursing her child, will begin to menstruate within five or six months after labor and occasionally within two or three months. This happens most frequently in those cases in which the mother has only enough milk to partly nourish the baby.

b. Beginning Menopause.—The age at which the menopause begins varies much in different persons. The average age is about forty-five, but it often begins somewhat earlier, in exceptional cases before forty. If the patient is past forty and the menstrual flow has been getting gradually less for several months, the menopause is probably beginning. There are two separate phenomena that usually accompany the climacteric and that may aid in the diagnosis—the "hot flashes" with some irritability and other evidences of nervousness, and the tendency to increase in the subcutaneous fat deposit. Neither one of these is pathognomonic, but both of them occurring in a patient past forty, with menstruation gradually diminishing, make the diagnosis of the climacteric fairly certain.

3. **Poor Health, with Pronounced Anaemia.** There is poor blood, poor general health and want of tone, secondary to some wasting disease or to chlorosis. The cause is determined by a careful general examination of the patient, including, when necessary, examination of the urine and of the sputum and of the blood. It is usually due to some chronic disease. It may come from any of the conditions mentioned under anemia in patients who have never menstruated (page 852) or from other troubles that reduce the patient's vitality. Among the latter may be mentioned prolonged lactation, pregnancies too close together, close confinement indoors with housework or children, and sameness of work day after day without stimulating variety.

4. **Acute Disease.** Acute diseases, such as typhoid fever, pneumonia, the exanthemata, influenza or even a severe cold, may delay menstruation or cause it to be missed entirely, particularly if the attack comes at about the menstrual time. On the other hand, the beginning of an acute disease may cause the menstrual flow to appear too soon or to be too free.

5. **Local (Pelvic) Disease.** The local diseases that may cause amenorrhoea, independent of their general effect on the blood, are those diseases that affect the integrity of the endometrium (from which comes the menstrual blood) or that affect the integrity of the ovaries (from which come the menstrual impulse).

a. Hyperinvolution of Uterus.—The process of involution following pregnancy and labor may continue farther than normal, reducing the uterus below normal size and so modifying the endometrium as to interfere with menstruation. This is a rare condition, but must be kept in mind in considering a case of amenorrhoea in a patient who has given birth to a child within a year or two. In one of my cases the patient was 28 years of age. Three years before she had had a severe infection following the birth of her child and there had been no menstruation since. Bimanual examination showed the uterus to be very small. On account of other trouble it was necessary to open the abdomen, and I had the opportunity of inspecting the internal genital organs. Everything was atrophic—the uterus, ovaries, tubes and round ligaments. The uterus was about half the normal size. Hyper-involution may occur also following simple curetment for chronic endometritis, though that is even more rare.

b. Cirrhosis of the Uterus.—This is the last stage of chronic metritis, that stage in which the wall of the uterus and the endometrium are largely converted into scar-tissue. There is loss of the functionating elements, marked diminution of the blood supply and consequent cessation of function before the appointed age.

c. Destruction of Ovaries by Disease.—The ovaries furnish the menstrual impulse, and when they are so damaged by disease that all of the functuating elements (Graafian follicles with contained ova) are destroyed, menstruation ceases. This rarely happens, for even in extensive and destructive pelvic inflammation, enough of one ovary usually survives to continue menstruation, providing the patient's general health is not too much affected.

6. Operative Removal of Structures. The structures essential to continuous regular menstruation are the uterus and some funtionating ovarian tissue.

a. Hysterectomy.—The removal of the uterus ordinarily means cessation of menstruation. In certain cases of supravaginal hysterectomy for fibroids, sufficient of the lower part of the corpus uteri may be preserved to continue menstruation (Chapter XV). Of course such an operation constitutes only a partial amputation of the corpus uteri. The removal of the cervix uteri alone has practically no effect on menstruation.

b. Double Oophorectomy.—The complete removal of both ovaries (removal of all ovarian tissue in the pelvis) causes menstruation to cease, either at once or within a few months. In many cases, even with both ovaries badly damaged, enough ovarian tissue may be left to continue menstruation. In suitable cases this is the practice ordinarily followed. To secure the desired result, however, the ovarian tissue left must continue to functionate.

On the other hand, in exceptional cases, when both ovaries have supposedly been completely removed, the patient has continued to menstruate and has even become pregnant. That means, of course, that some ovarian tissue was left. Some part of the normal-shaped ovaries may have been unwittingly left or there may have been lobulation of one ovary. Islands of ovarian tissue, from malformation of ovary, are occasionally found in the pelvis, either close to the normal site of the ovary or at some distant part of the broad ligament (page 841).

The removal of one ovary has little or no effect on menstruation, provided the other continues to functionate. The removal of one or both Fallopian tubes has practically no effect on menstruation.

7. Obesity. The condition of the system associated with the excessive deposit of fat very frequently causes diminution in the menstrual flow and may cause it to cease altogether for a time. This may occur with obesity in girls as well as in older women.

8. Nervous Impressions. Nervous impressions may delay or stop the menses for a few months, or delay their appearance if occurring at puberty. Among these may be mentioned: a long journey (particularly on shipboard), change of residence from country to city or vice versa, extraordinary grief, joy, or anxiety, or exciting work, study (as in preparing for examination), taking up a new occupation, financial troubles, love affairs and difficulties in home life. Any of these may cause an expected menstruation to be missed.

Treatment.

The treatment required is indicated by the particular abnormal condition present. The methods of treatment for the various organic diseases are given in the appropriate chapters.

In anemia employ the course of tonic treatment followed by emmenagogues, previously described for anemia in patients who have never menstruated (page 854).

In married women, with no decided organic lesion, the poor general health may be due to prolonged lactation, to pregnancies coming too close together, to the worry and care of children, with, perhaps, too much housework besides, or to too close confinement indoors with monotonous housework. Close confinement in the house, with the same round of housework day after day and month after month, without a diverting change of work or a stimulating object to be attained, is enough to produce digestive disturbance, malnutrition, anemia and general depression, both physical and mental. In the same way the woman who devotes her time largely to society may, by the constantly repeated round of social exactions, become completely "fagged out." Also, the woman who does office work may be worn out by having to do the same work day after day for months and years.

In all such cases, besides the regular tonic course, a change or break in the regular routine is advisable. This change should be a decided one. It should produce not only a change in physical activity, but also should change the current of thought and furnish a new direction for mental activity. The prescription to bring about these changes will vary much in different cases, depending to a large extent on the circumstances and inclinations of the patient. With some it will be a prolonged trip abroad, leisurely visiting places of interest; with others, a trip to the seashore or to the mountains for a few weeks or several months. In the cold, cloudy months of the winter a sojourn in the South may be advisable; while, to escape the heat of summer, the northern lake resorts are available in addition to the mountains and the seashore. In other cases a few weeks' rest in the country will answer the purpose, or a prolonged visit with friends in another city, or the employment of help, so that the patient has less routine housework or office work, and more time for rest, amusement, outdoor exercise and some diverting leisure pursuit, such as photography, painting, music, fancy work, or one of the many other things which furnish physical and mental diversion. A change of thought and action for a few weeks or a few months, as the case may be, is one of the best tonics, and, when combined with suitable medication and hygiene, it may make one "feel like a new person." The regular work can then be taken up with interest and pleasure, and can be executed with vigor and satisfaction. Keep in mind, however, that, to continue in good health, the patient must take time for proper rest, nourishment, exercise and relaxation.

Obesity. When the patient is considerably heavier than she should be, particularly if she has increased in weight recently, she should be placed on treatment for correcting the faulty metabolism that results in fat deposition. The systematic treatment of this condition belongs to general medicine and cannot be considered in detail here. I will say only that I have obtained good results in these cases from the granular effervescent Vichy and Kissingen salts given on alternate days—one day the Vichy and the next day the Kissingen, etc. This should be continued for two or three months and combined with a more or less strict diet. Even when the weight is not noticeably reduced, the metabolism is improved, the patient is placed in better general health and hence in better condition for menstruation. Of course, when the stout patient is anemic, she requires a course of iron along with the other treatment.

When the amenorrhoea is apparently due to **nervous impressions** (a long journey, change of environment, grief, joy, anxiety), no treatment is required except for accompanying disturbances. When the patient becomes accustomed to her new surroundings, the menses will probably return. In the meantime any symptomatic disturbance should be treated—a sedative if needed, a tonic if indicated, an emmenagogue at once if thought best, or later if the menses do not appear.

Supppression of the menses requires rather active treatment. First satisfy yourself that you are not being deceived—i. e., that no pregnancy is present. Then employ measures to produce pelvic congestion and to overcome the nervous inhibitory influence which has been started by exposure to cold or nervous shock, or whatever it was that caused the sudden suppression of the flow. If the patient is very nervous or in pain, give sedatives in sufficient doses to set the nerves at rest. Have the patient take a warm sitz bath (a mustard foot bath may be given at the same time), then have her put to bed, covered up warmly and hot applications made to the lower abdomen and genitals. Hot drinks, that tend to start up the secretory action of the skin and other organs, are then advisable. If the bowels have not moved well, direct a large enema of warm water or warm soap water.

As to medication, that is largely symptomatic. In sudden suppression of the menstrual flow (from exposure to cold or nervous shock), accompanied by full pulse and feeling of fullness in the head and in the pelvis, give drop doses of tincture of aconite every half hour until the circulatory tension is relieved. Used in conjunction with the measures above mentioned, this often causes the flow to return in a few hours. Tincture of pulsatilla, given in two-drop doses every 3 hours, is sometimes effective in relieving the distress and restoring the flow. If there is severe pain, the phenacetin and codeine capsules (see Formulae) may be required.

SCANTY MENSTRUATION.

A diminution in the menstrual flow, or a too slight flow from the beginning of menstruation, is caused by the same condition that leads to absence of the menses (with the exception of those obstructive lesions that prevent the escape of any blood), and the treatment also is practically the same (page 854).

EXCESSIVE MENSTRUATION (MENORRHAGIA.)

The menstrual flow may be too free or it may last too long. In either case the condition is known as excessive menstruation or menorrhagia. The normal duration of the flow and the amount of blood lost varies much in different patients. With each patient, however, the duration of the menstrual flow and the amount of blood lost is fairly constant—that is, the patient menstruates about the same length of time and loses about the same amount of blood at each normal menstruation. If there is decided increase in the amount or in the duration of the flow, the patient may be said to menstruate excessively, though the same amount and duration of the flow in another individual might be normal if usual with her. Each patient is somewhat of a law unto herself in this respect. Therefore, to make the diagnosis of excessive menstruation, we need to know something of the patient's menstrual history.

CAUSES.

Excessive menstruation is due to those conditions which cause congestion of the pelvis, especially those which cause congestion of the uterine mucosa. It may be caused by any of the following conditions:

1. **Simple Hypertrophic Endometritis.** This is the usual cause of menorrhagia occurring in virgins. As explained in a previous chapter (page 583), this form of endometritis is not real inflammation as that term is ordinarily understood, but is simply a nutritive change. The causes, diagnosis and treatment of simple endometritis are given on pages 583 to 586.

2. **Infected Endometritis.** Inflammation of the uterus, either acute or chronic, tends to cause uterine congestion and consequent increase of the menstrual flow.

3. **Subinvolution,** without infection, is a rather frequent cause of prolongation of the bloody lochia after child-birth, and of excessive menstruation later.

4. **Malposition of uterus,** particularly marked retrodisplacement, is likely to cause excessive menstruation—in fact, this is one of the prominent symptoms in a large proportion of the cases of backward displacement of the uterus (page 600).

5. **Cervical polypi** may cause excessive menstruation and also bleeding between the menses. It is surprising how much bleeding will be caused in some cases by one or two small polypi in the cervix.

6. **Fibro-myoma of uterus** causes menorrhagia when intramural or submucous. This excessive loss of blood during menstruation is one of the prominent symptoms of fibroid (page 631) and is rarely absent in the classes mentioned.

7. **Cancer of Uterus.** Malignant disease of the uterus in any form, whether affecting the cervix or the corpus uteri, is likely after a time to show extra menstrual bleeding. In the early stage, however, the bleeding is more likely to appear as an occasional streak of blood between the menses, noticed after coitus or after extra walking or lifting (page 670).

8. **Pelvic inflammation,** both acute and chronic, causes periuterine and uterine congestion, with resulting excessive menstruation.

9. **Ovarian and broad ligament tumors** interfere with the return of blood from the uterus and in that way cause uterine congestion, with resulting excessive menstruation.

10. **Obstructive Diseases.** Diseases that interfere with the return of blood from the pelvis, such as heart disease with failing compensation, obstructive liver diseases and abdominal tumors, necessarily tend to uterine congestion and consequent menorrhagia.

Diseases that cause frequent straining efforts, such as constipation, chronic diarrhoea, stricture of rectum and chronic cystitis, lead to pelvic congestion and excessive menstrual flow.

11. **Functional Pelvic Congestion.** In some cases no lesion is found on examination and the prolonged menstruation is evidently due simply to functional pelvic congestion. This functional pelvic congestion may be caused by many conditions, among which are the following:

a. Work that favors pelvic congestion, such as standing for hours (as clerks must do), or running a sewing machine for hours (as is done by the seamstress), or lifting and working about the sick (as is done by the nurse), may lead to excessive menstruation.

b. Excessive or violent exercise, as is sometimes taken in the excitement of outdoor sports.

c. Recent marriage. In the first few months after marriage there is frequently some increase in the menstrual flow, but ordinarily it need cause no alarm, for it usually disappears as the pelvic organs become accustomed to the changed conditions.

It must be kept in mind, also, that an early abortion coming about the menstrual time, or an early tubal pregnancy with rupture or tubal abortion at the menstrual time, may very closely resemble an ordinary menorrhagia, with some extra pain and a few blood clots.

TREATMENT.

It is convenient to divide the treatment into (A) treatment during the flow and (B) treatment between the periods.

Treatment During the Flow.

You are called to see a patient who is menstruating, the flow being too free or having lasted too long. By questioning the patient it can usually be determined certainly that it is a regular menstrual flow and not bleeding connected with an early abortion or threatened abortion, or tubal pregnancy. As the patient is menstruating, of course no examination is made unless there are indications of serious trouble. If the questioning shows clearly that the trouble is simply excessive or prolonged menstruation, the patient may be given some uterine astringent internally.

1. Internal Uterine Astringents. Ergot, in its various forms, is one of the most reliable of the uterine hemostatics for internal use. A satisfactory way of administering it is the ergotin and nux vomica capsule (Formulae), one capsule every 4 to 8 hours. Or the fluid extract or other preparation may be given. Ergot is efficient in all forms of uterine bleeding, except when pregnancy is present. It must never be given when there is a suspicion of pregnancy.

Another reliable uterine hemostatic is stypticin. It may be given in the prepared ¾ gr. tablets. I usually order it in ½ gr. to 1 gr. doses in combination with ergotin in capsules, one capsule to be taken every 4 to 8 hours, depending on the amount necessary to control the bleeding. Stypticin is cotarnine hydrochloride. Cotarnine is derived from narcotine, which is a product of opium. Stypticin is a yellow powder of very bitter taste. It is conveniently given in capsules, the dry powder being placed directly in the capsules. It is expensive to the patient, and, for that reason, I frequently give the ergotin capsules for the intermenstrual period and the stypticin only during the flow. A later and allied product is styptol, a combination of cotarnine with phthalic acid. It has about the same action and indications and dosage as stypticin.

Hydrastis is an old remedy much used as a uterine hemostatic. Its action is not so prompt and marked as that of ergot, but is frequently more lasting, and, in addition, it is an intestinal tonic. Hydrastinine, an alkaloid from hydrastis and closely allied chemically to stypticin, is frequently used to check menorrhagia. It is expensive, usually costing about twenty cents per grain. Calcium chloride, also, is used as an internal hemostatic. Strychnia and other tonics tends to tone up relaxed muscular tissue and may thus diminish bleeding.

2. Laxatives. At the beginning of the treatment the bowels should be moved well with a saline purgative, and after that laxatives should be given as needed to secure one or two good bowel movements daily.

3. Rest in Bed. The patient should stay in bed during the flow if possible. If the bleeding is at all severe, this is imperative.

The employment of the three measures above mentioned will usually diminish the flow decidedly within twenty-four hours.

4. Sedatives. If the patient is nervous and restless or if there is dysmenorrhoea (a very frequent accompaniment of menorrhagia), give potassium bromide, 15 gr. every 3 hours, as needed to give rest and sleep. This makes the patient much more comfortable, and, in addition, the bromides (particularly potassium bromide) are supposed to aid somewhat in checking excessive menstrual flow.

If the pain is severe, the bromides will probably not be sufficient to relieve it, and then opium is indicated. Besides checking the patient's sufferings, the opium has a decided effect toward temporarily checking the uterine bleeding. When opium is given, it should be in such form that the patient does not know what she is taking. A very good formula is ergot in one grain and opium one-half grain, given in a pill and repeated every six to eight hours as needed (see Formulae).

5. Medicine for Special Indications. If there is heart trouble with failing compensation, digitalis or other heart stimulant is indicated.

If there is a troublesome cough, or bladder or rectal disturbance, or other affection, give medicine for the same.

6. Vaginal Tamponade. Another method and a very efficient one for temporarily checking a serious loss of blood during menstruation is to tampon the vagina firmly, the same as for hemorrhage from any other cause. This temporarily stops the loss of blood from the relaxed atonic uterus and preserves that much for the anemic patient, who can ill afford to lose it. This packing may be removed in one or two days, and another applied.

The systematic use of this method in suitable cases was brought before the profession by Dr. E. C. Gehrung, who, from an extensive experience with it. states that no ill-effect follows this arbitrary checking of the menstrual flow after a proper amount of blood has been lost. It is a useful temporary expedient for preserving to the anemic patient, over a few menstrual periods. the blood which she can ill afford to lose by stopping the flow after the third or fourth day of menstruation. In this way the downward course of the trouble may be checked and the patient's condition held stationary, while other measures are employed to overcome the cause of the excessive menstruation.

(B.) Treatment Between Menstrual Periods.

Having checked the flow temporarily, the next thing is to prevent the recurrence of the excessive menstruation. The indications in such cases are:

To reduce congestion of the uterus and other pelvic structures.
To tone up the uterus.
To put the patient's blood in good condition.
To correct local diseases.

The measures for accomplishing these objects are as follows:

1. **Laxatives.** There should be one or two good bowel movements daily, and at the menstrual period the bowels should be given a special clearing out.

2. **Uterine Tonics.** Ergot is one of the best drugs for toning up an atonic uterus. It produces also some constriction of the blood vessels and thus diminishes the amount of blood in the organ. This has a marked effect in checking excessive loss of blood. The ergotin and nux vomica capsule (see Formulae) is an excellent form in which to give the ergot. This may be given three times daily, between the periods. It is a good general tonic. At the menstrual period it is well to increase the frequency to every 6 hours.

Stypticin, styptol or the other hemostatics mentioned under "treatment during the flow" may be administered during the intermenstrual period.

3. **General Tonic Remedies.** Menorrhagia is not a disease. It is only a symptom, and the physician must find what is back of it as an etiological factor.

If anemia is present, the cause must be sought and the patient placed on the required tonic regimen and medication.

If there is heart disease, portal obstruction or any other condition that interferes with the return of blood from the pelvis, it must receive appropriate treatment.

4. **Correction of Local Disturbances.** Any local disease present should be determined and treatment instituted accordingly. This is a very important part of the treatment of menorrhagia and tends more than anything else to bring about a permanent cure. The pelvic disorders that may cause menorrhagia have just been enumerated and the various methods of treatment are given in the appropriate chapters.

Often the correction of a retro-displacement and the retention of the uterus in proper position, by pessary or otherwise, will effect a cure of menorrhagia.

In some cases of hyperplasia of the endometrium from simple endometritis or subinvolution or fibromyoma, astringent intra-uterine applications, made once or twice weekly in the intermenstrual period, may suffice to overcome the excessive menstrual flow. In other cases it will be necessary to employ curetment. Intra-uterine treatment (applications or curetment) should always be accompanied by such assisting measures as are indicated.

[Metrorrhagia (bleeding between the menses) is considered on page 904.]

PAINFUL MENSTRUATION (DYSMENORRHOEA).

Dysmenorrhoea is the most troublesome of the menstrual **disturbances**, causing many women to suffer from one to several days every month. In some cases the suffering is so severe that menstruation constitutes a monthly torture, which, aside from the immediate pain, leaves the patient worn and weak for many days afterwards, and she lives in constant dread of the next menstrual period. Even in the milder cases the constant recurrence of pain and physical and mental depression may gradually induce a serious condition of malnutrition and neurasthenia.

Dysmenorrhoea is not a disease, but only a symptom. It is caused by a great variety of conditions and is a symptom of many pelvic diseases. However, no one organic lesion has been shown to be the essential or sufficient cause of menstrual pain, for every condition so considered at one time or another has been found to exist in some instances without accompanying menstrual pain.

It is apparent that in practically every case, dysmenorrhoea is due to a combination of abnormal conditions, either local or general or both. The work of the physician in each case is (a) to determine the abnormal conditions present in that particular case, (b) to form an estimate of the relative importance of each in the causation of the menstrual distress and (c) to treat the patient accordingly.

It has been customary to group the cases of dysmenorrhoea into four classes as follows, each class supposedly representing distinct etiological factors:

Neuralgic or Ovarian Dysmenorrhoea.
Congestive or Inflammatory Dysmenorrhoea.
Obstructive or Mechanical Dysmenorrhoea.
Membraneous Dysmenorrhoea.

Neuralgic dysmenorrhoea is simply neuralgia of the ovarian, uterine and other pelvic nerves, coming on at the menstrual period because of the increased pelvic congestion and the greater impressionability of the nervous system generally at that time.

The pain is neuralgic in character—i. e., sharp and variable. It radiates from the ovarian region of one or both sides to the uterus and to the iliac, abdominal, lumbar and sacral regions. Not infrequently it extends down the thighs. In a large proportion of the cases there is a severe attack of headache at some part of the menstrual epoch and occasionally a distinct neuralgia in some other part of the body. The pain appears to be independent of the character of the menstrual flow. It may be most intense a day or two before the flow or it may come on after the flow, or it may come and go during the whole time. Thus it is erratic and is likely to vary much in the different menstrual periods without apparent cause.

This form of dysmenorrhoea occurs usually in women of a neuralgic or rheumatic diathesis. Neuralgic or rheumatic pains are often felt in the intermenstrual periods, either in the pelvis or elsewhere. Hyperesthesia over the abdominal surface and pain are frequently noticeable, and this is much increased at the menstrual time.

This form of dysmenorrhoea is liable to be associated with anemia, indigestion, neurasthenia, hysteria and allied disturbances. Patients with rheumatism and gout are also particularly prone to menstrual pain without apparent causative lesion in the pelvis. In the cases of so-called "neuralgic" dysmenorrhoea, ovarian pain usually plays a prominent part—so prominent that this is sometimes referred to as "ovarian dysmenorrhoea."

Congestive or inflammatory dysmenorrhoea is due to congestion within the pelvis, particularly congestion of the uterine mucosa. This congestion may be due to some inflammation in the uterus or around it, or it may be due to some non-inflammatory condition, such as uterine displacement, or a tumor of the uterus or vicinity, or a functional pelvic congestion (page 864).

The pain is that of inflammation, and is felt as a soreness or throbbing pressure in the pelvis or back. It may radiate into the iliac regions, or up the spine or down the thighs. If the inflammation is principally in one side of the pelvis, the pain is most severe there.

The pain is usually most severe the first day or two of the flow, but may last all the time. The pain may begin a day or two before the flow, and this is especially liable to occur in those cases of inflammatory trouble involving the ovary. There is also much general soreness through the pelvis, which is increased by walking or standing.

The diagnostic sign of this variety of dysmenorrhoea is the character and constancy of the pain and the fact that there is trouble between the menses—evidence of inflammation or displacement, or tumor or something that keeps up chronic pelvic congestion. The various causes of pelvic congestion are mentioned in detail under menorrhagia (page 863).

Obstructive or mechanical dysmenorrhoea is, as its name implies, dependent on the obstruction to the outflow of the menstrual blood. The obstruction may be due to circular stenosis of the canal from imperfect development, or from cicatricial narrowing or from spasmodic constriction of the circular muscle fibers, or from swelling of the uterine mucosa. It may be due also to a sharp bend in the canal due to flexion of the uterus—usually an anteflexion, occasionally a retroflexion. The obstruction is usually found about the internal os, though in very exceptional cases it may be at some other point along the canal or at the external os. The canal may be narrowed by a tumor situated in the cervix or outside the uterus. A small polypus within the uterus may drop into or against the internal os and block it. Again, the menstrual blood may contain clots, which are expelled with difficulty even when the canal is of normal size.

The characteristic of mechanical dysmenorrhoea is that the pain is paroxysmal in character, apparently corresponding to painful uterine contractions brought about by the effort of the uterus to force the blood past the obstruction. The pains are periodical—very severe at times, with intervals of rest between—somewhat on the order of the pains of a miscarriage. When the menstrual flow is freely established, the severe pain usually disappears.

Dysmenorrhoea due entirely to mechanical causes, or obstruction, is rare.

There are usually complicating conditions that are as important as, if not more important than, the obstruction. The dysmenorrhoea of young women, so frequently associated with anteflexion, was for a long time supposed to be due to obstruction in the canal. But it is now known that the obstruction is only one of the factors, and in most cases one of only secondary importance, as explained later (page 871).

Membraneous dysmenorrhoea is the term applied to that form of painful menstruation accompanied by the expulsion of membrane from the uterus. The membrane is usually passed in small pieces, though occasionally it is thrown off as a complete cast of the interior of the uterus. It consists of the superficial layers of the uterine mucous membrane, and is thrown off as the result of nutritive changes which are not yet understood.

The pains come with the flow and are paroxysmal—of the same character as the pains of mechanical dysmenorrhoea, but very severe, resembling labor pains. After these have continued for several hours or a day or two, pieces of the membrane are expelled. There is then relief unless other pieces pass. The membrane, mixed with the menstrual flow, is the diagnostic sign of this form of dysmenorrhoea. Care must be exercised not to confound it with miscarriage. It usually recurs every month or so and may last for years. The cause is not definitely known.

In regard to the above classification, with the exception of the cases of membraneous dysmenorrhoea, it does not make a very satisfactory grouping of the cases. In a few patients the dysmenorrhoea apparently belongs entirely to one of the forms mentioned—i. e., neuralgic or inflammatory or obstructive. In most cases, however, there is such a mixture of neuralgic. congestive and obstructive features that it is impossible to assign the case exclusively to any one of these classes. For the purposes of diagnosis and treatment, it is convenient to divide the cases of dysmenorrhoea into two groups—the first group including the cases of dysmenorrhoea in the virgin and the second group including the cases of dysmenorrhea in the married woman.

(A.) DYSMENORRHOEA IN THE VIRGIN.

The patient, a girl or unmarried woman, comes complaining of pain at the menstrual periods. The pain may be so severe that the patient is obliged to go to bed for one or two or three days at each menstrual period, or it may be less severe, so that she is able to be up and about, but is miserable. Sometimes the pain is very severe, but going to bed gives no relief. The pain may have been marked from the first menstruation or it may have been slight at first, with gradual increase since. There is usually a decided difference in the pain in the different menstrual periods, being much more troublesome at some periods than at others. In many cases the pain begins a day or two before the flow. It is usually much relieved within 24 hours after the flow is well established.

Along with the menstrual pain there may be loss of appetite, nausea, lassitude and neuralgias. There is nearly always decided weakness during the flow and for one to several days thereafter. Menstruation may be otherwise normal, or there may be scanty menstruation or excessive menstruation. In many cases the patient has no particular disturbance during the intermenstrual period.

Causes of Dysmenorrhea in the Virgin.

The causes are varied, but there is one group of conditions that overtops all others in the frequency of occurrence. I shall consider it first.

1. Neurotrophic Dysmenorrhoea. In the majority of cases of dysmenorrhoea in the virgin there is a combination of conditions, comprising anteflexion of the cervix, some stenosis of the cervical canal and marked hyperesthesia of the uterine tissues, especially in the neighborhood of the internal os. This condition is a very important one on account of the frequency of its occurrence and the suffering it causes and the stubbornness with which it resists treatment in many cases.

What is the Cause of the Pain in These Cases?

It was for a long time supposed to be due to the narrowing of the canal at the internal os by the anteflexion present, with the consequent obstruction to the outflow of menstrual blood. That the obstruction does play some part is shown by the fact that when the obstruction is removed the pain is usually considerably diminished. But simple removal of the obstruction (dilatation of cervical canal) does not always relieve the patient entirely, and in some cases the relief from this measure is slight or wanting, showing conclusively that the obstruction is not the only factor in the case. Again, it is a matter of common observation that some patients, with as much or more anteflexion and obstruction as are found in these cases, have no dysmenorrhoea. In 37 cases of decided anteflexion, reported by A. M. Judd, nine were without menstrual pain, 19 had menstrual pain beginning before the flow and nine had only premenstrual pain. In 26 cases of anteflexion in the unmarried, reported by C. R. Hyde, five had no menstrual pain, 20 had menstrual pain beginning before the flow and one had pain only after the flow. So the essential disturbance must be sought further. Endometritis has been put forward as the cause of the pain—at least of that portion of it which is not relieved by the removal of the obstruction. But this hypothesis also fails. In not a few cases of dysmenorrhoea persisting after dilatation the mucosa, removed by curetment, has been found to be practically normal. On the other hand, many patients with decided endometritis have no particular menstrual pain.

There is one pathological condition that seems to be fairly constant in the class of cases under consideration, and that is hyperesthesia or marked irritability of the nerves of the uterine mucosa and muscles, especially in the neighborhood of the internal os. This is noticeable on sounding the uterus and especially on dilating the internal os without anesthesia. It is indicated also by the painful muscular contraction or uterine "cramps" occurring without apparent cause. The theory that the essential or underlying condition in these cases is hyperesthesia of the mucosa and muscle due to a nutritive disturbance, affecting the nerves and other tissues, seems to be the most tenable one. It explains better than any other hypothesis yet advanced the various phenomena observed. It shows why the symptoms may persist to a greater or less extent after removal of the obstruction at the internal os and after removal of the hyperplastic mucosa. It shows why the symptoms occur in patients with no obstruction and with no decided structural change in the mucosa. It shows why measures directed toward improving nutrition and allaying nerve irritability will sometimes produce decided improvement without any local treatment. In short, it explains what has already been worked out clinically—that the narrowing of the canal and thickening of the endometrium are simply complications that may or may not be present. When they are present they aggravate the trouble and require treatment. But unless the nutritive disturbance of the uterine muscle and mucosa is also improved sufficiently to restore the nerves to fairly normal condition, the pain will continue to a considerable extent.

The marked effect of pregnancy and parturition in these cases points strongly to its being largely a nutritive disturbance. Pregnancy has a most profound influence upon the nutrition of the uterus. To be sure, the parturition effectively overcomes the stenosis, but this does not account for the uniform and marked benefit, for we have already found that in many cases the stenosis is not an important factor. The beneficial effect of curettage in these cases is likewise due, to a large extent, to its marked stimulation of the nutrition of the uterus.

Another point in favor of the supposition that this trouble is essentially a nutritive disturbance affecting the whole uterus (both muscular tissue and mucosa) is the fact that it is very frequently accompanied by evidences of imperfect development. Such cases are referred to as cases of "infantile uterus." The evidences of imperfect development are late beginning of the menses, irregular menstruation and decided anteflexion of the cervix (failure of the cervix to take its proper direction across the vaginal canal). In fact, the association of imperfect development with this form of dysmenorrhoea is so common that some writers attribute the dysmenorrhoea to the imperfect development. It seems to me, however, that a better view of the matter is that the imperfect development and the dysmenorrhoea are both due to the same cause—viz., poor nutrition.

I think we may go a step further and say that these two conditions—imperfect development and neurotrophic dysmenorrhoea—are due to poor nutrition largely at a certain period of life—namely, at the period of puberty. The victims who suffer most are usually women who during puberty were poorly nourished from a physical and developmental standpoint, and were subjected to influences that would retard uterine development (see page 854). In many cases this poor nutrition persists, and is only too apparent when the patient comes to the physician to secure relief from the dysmenorrhoea. In other cases the patient, having been for some time out of school and taking more fresh air and sunshine and exercise, has acquired good blood and a good color. But that has not been sufficient to correct the evil effects of a pernicious regimen during puberty—a regimen which promoted mental activity at the expense of physical development.

2. Membraneous Dysmenorrhoea. This form of dysmenorrhoea, or rather the meaning of the term, has been explained (see page 870). The cause and exact pathology are still in doubt. It is sometimes designated as "exfoliative endometritis," though careful examination of the exfoliated membrane has shown that in some cases no endometritis is present.

Membraneous dysmenorrhoea is a comparatively rare affection. It usually appears early in sexual life, though some cases have been reported in which the disease first appeared in middle life. It usually extends over several years. At certain menstrual periods the endometrium is cast off and appears in the menstrual discharge as shreds. Occasionally the mucosa is cast off as one piece, forming a cast of the uterine cavity. The detachment and expulsion of a membrane with the menstrual flow (decidua menstrualis) may take place when the endometrium is practically normal in structure or when it is the seat of one or more of the several inflammatory and nutritive changes already described. The expelled pieces will, of course, exhibit whatever structural change is presnt in the endometrium; consequently in a series of cases of membraneous dysmenorrhoea, examination of the membrane may show many different inflammatory and nutritive changes, none of which are peculiar nor distinctive of membraneous dysmenorrhoea, but due to independent pathological conditions in the endometrium.

Membraneous dysmenorrhoea is undoubtedly due to a marked nutritive change, but just what lies back of this nutritive change has not been certainly determined. F. F. Lawrence, in reporting a number of cases, advanced the idea that the condition is usually due to pelvic inflammation following an attack of one of the exanthemata near puberty. He reported 42 cases of membraneous dysmenorrhoea in which there was present tubal or ovarian disease requiring operation. In 19 cases the disease was unilateral and in the remaining bilateral. In 33 of the 42 cases the trouble appeared, from the history, to have started from an attack of scarlatina, measles, mumps, rheumatism or small-pox. In nearly all (the report is not definite) there was no further membraneous dymenorrhoea after the removal of the pelvic disease. He concludes that membraneous dysmenorrhoea is due to trophic changes in the endometrium secondary to adnexal disease, and that this adnexal disease is usually a sequel of one of the exanthemata occurring near puberty. He concludes also that the adnexal disease is usually unilateral at first and may be prevented from extending to the other side by prompt attention. As a result of these conclusions, he holds (a) that tubal and ovarian complications occurring with the exanthemata near puberty should be watched for and treated, (b) that in every case of membraneous dysmenorrhoea a careful history should be gotten with that point in view, (c) that when unilateral adnexnal disease is found, prompt operation should be carried out to prevent the trouble becoming bilateral, and (d) that the facts in the case "would seem to warrant removal of the tubes and ovaries on one or both sides when shreds or casts are a part of painful menstruation."

The facts brought out above are certainly interesting, and study along this line may help to clear up part of this subject. With the last conclusion, however, I must differ most decidedly. Removal of the adnexa on one or both sides should, as a rule, be made only for a distinct adnexal lesion and not simply for painful menstruation, whether accompanied by shreds or not (page 888). The fallacy of operating simply for the dysmenorrhoea is shown by the fact that the dysmenorrhoea may be as severe after operation as before. This fact was brought out in the discussion of the above paper by L. H. Dunning, who stated that "one of the most severe cases of membraneous dysmenorrhoea he ever saw occurred in a woman after he had removed bilateral pus tubes and both ovaries. She menstruated for two years afterward and had membraneous dysmenorrhoea." In a previous paper Dr. Dunning had reported a case of membraneous dysmenorrhoea which persisted after abdominal section and treatment of the adnexal disease, and finally yielded to intra-uterine applications of electricity.

Concerning diagnosis of membraneous dysmenorrhoea in the virgin, the passage of shreds of membrane with the menstrual flow establishes the diagnosis. There is no other affection of virgins presenting such symptoms. It is well, however, to have some of the membrane saved for inspection and microscopic examination, for the patient may be deceived by blood clots or shreds of bloody mucus. It must be kept in mind, also, that in certain cases the supposed virgin may not be a virgin, and that, consequently, the supposed "decidua menstrualis" may be a decidua of a different character (page 858).

3. Atrophy of Uterus. In certain cases in virgins past 30 years of age and also in sterile married women there seems to be some atrophy of the uterus, which has failed to receive the stimulus of pregnancy. The patient had no particular pain in her earlier years, but gradually menstrual suffering has appeared, and examination shows no lesion, except a rather small atrophic) cervix, with more or less stenosis. This is really a form of neurotrophic dysmenorrhoea, but is due to trophic disturbance in later years instead of during the developmental period. This is one of the classes in which the stem pessary is sometimes advisable (page 882).

4. Backward Displacement of the Uterus. Painful menstruation is one of the symptoms frequently produced by marked retrodisplacement of the uterus. Kelly found that of 229 consecutive cases of dysmenorrhoea admitted to Johns Hopkins Hospital, 41 per cent. were associated with retrodisplacement of the uterus, 37 per cent. with pelvic inflammatory disease, and 11 per cent. with fibromyomata. The proportion of cases of retrodisplacement is, of course, much larger in patients who have borne children than in virgins.

In 184 cases of retrodisplacement of the uterus, reported by A. M. Judd, 108 suffered with menstrual pain, either during the flow or immediately before it. A slight retrodisplacement of the uterus, less than the second degree, does not give rise to particular disturbance and should not be accepted as the cause of dysmenorrhoea.

5. **Fibromyomata of the Uterus.** Painful menstruation is a frequent symptom in uterine myomata, particularly when the nodules are interstitial or submucous.

6. **Chronic Pelvic Inflammation** (salpingitis, oophoritis, cystic ovary). Salpingitis is comparatively rare in the virgin, for the various causes of pelvic inflammation in the married woman are not present. Chronic oophoritis from local circulatory and nutritive disturbance is more frequent and may give rise to some dysmenorrhoea.

7. **Pelvic Tuberculosis.** This is not so rare as was formerly supposed, and should be thought of whenever there are evidences of chronic pelvic inflammation in a virgin.

8. **Ovarian or Broad Ligament Tumors.** These may arise in the virgin and give rise to the usual symptoms and signs, which are detailed in the appropriate chapter.

9. **Inflammation of Adjacent Organs**—bladder, rectum, appendix. Any adjacent inflammatory trouble is likely to be considerably aggravated by the menstrual congestion. Occasionally the trouble is so slight as to be hardly noticeable except during the menstrual exacerbation. In such a case it may at first be considered one of the usual varieties of dysmenorrhoea, but careful watching will show symptoms pointing to the organ involved, and evidence of such disturbance may be found in the intermenstrual period. Chronic appendicitis not infrequently presents decided menstrual exacerbations. And in some cases the intermenstrual symptoms are so slight or indefinite that the true nature of the affection is not suspected until abdominal examination shows tenderness at McBurney's point and other evidences of chronic appendicitis.

10. **Functional Pelvic Congestion.** Chronic functional congestion of the pelvis, due to constant standing, long walking or other causes (page 864), may cause very troublesome dysmenorrhoea.

11. **Reflex Dysmenorrhoea.** There are occasional cases of dysmenorrhoea apparently due to reflex disturbance from a distant part of the body. One of the most striking of such reflex connections is that from within the nose. In certain cases, dysmenorrhoea has apparently been due to some pathological intranasal condition and has been relieved by treatment of the same. These are sometimes referred to as cases of "nasal dysmenorrhoea." In certain other cases, menstrual pain has been relieved by cocainization of particular areas of the normal nasal mucosa. This fact was first brought to the attention of the profession by Fliess, a German rhinologist, who in 1897 presented to the Berlin Obstetrical Society a paper detailing his experiments in that direction. He found that in some cases of dysmenorrhoea the pain disappeared

within a few minutes after the application of a 20 per cent. cocaine solution to certain areas in the nose. These areas were the anterior end of the inferior turbinated bone of each side, and a spot just opposite this on the septum, sometimes referred to as the tuberculum of the septum.

Fliess in his experiments divided the cases of dysmenorrhoea which he encountered into two classes—first, those in which the pain ceased as soon as the menstrual flow began, and, second, those in which the pain continued along with the flow. In the first class he noticed no particular effect from the intranasal cocaine application. In the second class, those in which the pain continued during the flow, the effect of the application of cocaine to the areas mentioned was striking. Usually within five to seven minutes after the application the pain ceased, and did not reappear during that menstruation. In some cases there was a pathological condition involving the areas mentioned, but the same result was obtained in many cases in which no disease was apparent. To eliminate "suggestion" as a factor in the case, the application of cocaine was made to other intranasal areas, instead of to those mentioned, and there was no result. Again, the designated areas, which are sometimes referred to as the "genital spots," were touched with an inert solution and there was no result. Again, in those cases in which temporary relief followed the application of cocaine to the intranasal genital spots, cauterization of those areas produced a cure, either permanent or lasting several months.

Good results have since been obtained by other reliable observers in various parts of the world and this measure has been established as useful in the treatment of certain cases of dysmenorrhoea. It has also served to call attention to the fact that certain pathological conditions in the nose may give rise to troublesome dysmenorrhoea, and hence in a case of dysmenorrhoea that persists without apparent cause a careful rhinological examination should be made to exclude nasal trouble or to discover and remove it.

12. Neurasthenia. The neurasthenic individual is prone to pains in the pelvis, as in other parts of the body, and, of course, they are likely to be most severe at the menstrual time. These pelvic pains occur without any apparent local cause. The cases usually present the characteristic of "neuralgic dysmenorrhoea." Such patients are often subjected to ineffectual treatment for many months—until the practitioner grasps the fact that he is dealing, not with a local condition, but with a widespread affection of the nervous system.

13. Hysteria. In patients with hysteria the disturbances may be much increased at the menstrual time. In some cases the hysterical manifestations between the periods are so slight that hysteria is not suspected until a careful examination is made.

Treatment of Dysmenorrhoea in the Virgin.

In a case of dysmenorrhoea in a virgin a local examination is not called for at first, unless the patient has taken a course of treatment without decided benefit or there are symptoms indicating some decided local lesion. If there are no symptoms between the menses, indicating some gross lesion, it is to be assumed that the menstrual pain is due to that most frequent cause—defective nutrition with uterine hyperesthesia, anteflexion of cervix and more or less stenosis of the cervical canal. This condition may, for convenience, be designated as "neurotrophic" dysmenorrhoea (page 871). The management of the cases may be conveniently divided into two parts—treatment during the menstrual flow and treatment between the periods.

Treatment During the Flow.

Suppose you are called to see the patient while she is menstruating and in much pain. The first thing to do is to relieve her immediate suffering.

1. **General Measures.** Put the patient to bed and have hot stupes applied to the lower abdomen, and the bowels freely opened by an enema or a purgative or by both. In some cases you will find that the patient has already carried out this part of the program and has also taken hot drinks of various kinds, having found by experience that these measures diminish the pain.

2. **Sedatives Internally.** For further relief, if the pain is troublesome in spite of the above measures, give some sedative. The time-honored viburnum prunifolium will often give considerable relief. It may be given either as the plain fluid extract or in the form of one of the less nauseating and more effective preparations supplied by reliable manufacturing drug houses—for example, Liquor Sedans (P. D. & Co.), which contains 4 gr. of viburnum, 8 gr. of hydrastis, 4 gr. of Jamaica dogwood and 5 gr. of cascara to each teaspoonful. If the pain is severe, this is not sufficient for immediate relief. For the severe pain I usually prescribe phenacetin and codein (Formulae). There are a number of other preparations that are sometimes used with benefit, among them camphor, fluid extract of cimicifuga and aromatic spirits of ammonia. In those cases in which nervousness is a prominent feature I give sodium bromide in 10 gr. to 20 gr. doses every three hours until the general nervous irritability subsides. The "dysmenorrhoea mixture" containing postassium bromid, guarana and celery (Formulae) is highly spoken of.

Morphine is rarely necessary. When the pain cannot be otherwise relieved, morphine may be given for temporary relief, but it should be given in such a way that the patient does not know what she is taking. The above measures usually give the patient relief, but she should stay in bed as long as there is any tendency of the pain to be severe.

3. **Intranasal Applications.** This may be tried in those cases in which the pain persists after the flow is well established. Schiff found this treatment effective in 35 out of 41 cases in which it was tried. Ephraim reported 18 successes in 24 cases, and Linder 10 successes in 16 cases. It has proved successful in some cases that persisted in spite of dilatation and curetment and various kinds of internal medication. On the other hand, it has failed completely in cases that apparently should have been relieved by it. It is uncer-

tain, but is worthy of trial in selected cases. When using this treatment remember the following points:

a. The application is made in each nostril, to the region including the anterior end of the inferior turbinated bone and the adjacent portion of the septum.

b. The strength of the cocaine solution usually used is 20 per cent., though possibly a weaker solution (e. g., 10 per cent.) would do.

c. The application should be made by the physician only, and the patient should not, as a rule, know what is being applied. The solution should not be given to the patient for use at home, as it might lead to the formation of the cocaine habit.

d. In those cases in which the cocaine application stops the pain, the "genital areas" in the nose should be cauterized by a rhinologist, that the reflex feature of the dysmenorrhoea may be cured or relieved for some months.

Treatment Between the Menstrual Periods.

After the pain is relieved for that menstrual period, then comes the question of treatment in the interval, to prevent or diminish the pain of succeeding periods.

In the virgin a local examination is not called for at first in the absence of decided local symptoms between the menstrual periods. The first thing to do is to put the patient on a regimen of general measures and internal treatment that will put her in first-class general health.

1. General Measures. The general measures are directed toward improving the general muscular tone, correcting anemia and overcoming constipation. They have been given in detail when speaking of the treatment of amenorrhoea (page 854).

2. Internal Treatment. The patient is placed on some good iron tonic (Formulae), with or without the addition of arsenic or strychnine or quinine, as thought best. She is given also such other medicines as are indicated by special symptoms present—e. g., by indigestion or cough, or sleeplessness or neuralgias. Remember that in gouty or rheumatic patients, dysmenorrhoea is sometimes much relieved by remedies directed towards overcoming the nutritional disorder manifested by the gout or rheumatism. **Laxatives** also are important when there is any tendency to constipation. Give some tonic laxative (Formulae) in sufficient doses to give one or two good bowel movements daily.

Some **antispasmodics** have a particular effect in overcoming menstrual pain. Decided benefit is often secured by the viburnum preparations previously mentioned, given in moderate doses, three times daily continuously and increased to every four or six hours during the flow. Apiol is useful, especially when the dysmenorrhoea is accompanied with scanty menstrual flow. It may be prescribed in pill form in doses of 3 to 5 gr. in ready-filled capsules. The active principle known as apioline is supplied in capsules containing three minims each. These are very convenient and in some cases seem to be active. Potter states, however, that the capsules of foreign make are unreliable and are usually inert. If there is excessive flow, the ergotin and cannabis Indica capsules may be used (see Styptics under Formulae). These are administered continuously for some months. The other preparations used especially for excessive menstruation, stypticin and styptol (page 865), have a tendency also to diminish the menstrual pain. Two-drop doses of tincture of pulsatilla, given three times daily for several days before the flow, has removed dysmenorrhoea in several cases.

Many other preparations belonging to the general class of antispasmodics, and mentioned in works on materia medica and therapeutics, have been used from time to time for dysmenorrhoea—with marked relief to some patients and with no relief to others. As a general proposition, those remedies which are beneficial in neuralgias are beneficial also in dysmenorrhoea. Thyroid extract has been used with benefit in some series of cases—one series showing marked benefit in 80 per cent. of the cases.

3. **Intranasal Examination.** In cases where there are any nasal symptoms, and also in the cases relieved by intranasal applications, a rhinological examination should be made. If some nasal disease is present, the removal of it may so improve the menstrual pain that the patient is saved much suffering and is spared the embarrassment of a pelvic examination.

4. **Pelvic Examination** to determine local lesion. If there is no decided benefit from the measures already mentioned after two or three menstrual periods, or at any time if severe local symptoms develop, the patient should be examined to determine if there is any local lesion. The details of the examination of a virgin have been given (page 74). In many cases it is best to make the examination under anesthesia, for the reasons there stated. When examining a patient under anesthesia for dysmenorrhoea or for menorrhagia, preparation should be made for dilatation and curetment, so those therapeutic measures could be at once carried out under the examination-anesthesia should the examination reveal a condition requiring it. Also, if a retrodisplacement is found, an attempt to correct it by manipulation may be made carefully while the patient is under the anesthetic.

The subsequent treatment will depend, of course, upon the conditions found on examination. If there is backward displacement of the uterus, treatment for that is required (page 603); if there is a fibroid tumor of the uterus, the treatment is for that (page 637); if there is pelvic tuberculosis, the treatment is for that, as indicated; if the trouble is neurotrophic dysmenorrhoea, that must receive the proper attention, and so down the list of possible conditions. The treatment for these various conditions will be found in the appropriate chapters.

The condition styled **neurotrophic dysmenorrhoea** belongs especially to this chapter. The local measures of treatment for this condition are, in general, measures directed toward overcoming the stenosis and removing an unhealthy endometrium, with such nutritional change as would necessarily follow this instrumentation. I will mention these measures as a continuation of the treatment of the dysmenorrhoea in cases where no more marked local lesion is found.

5. Thorough Dilatation and Curetment under Anesthesia. As previously explained, this should as a rule be the first local measure employed in the virgin, as it is not advisable to employ any local treatment unless it is of such character that it will have some decided effect. If the patient is to be anesthetized for examination, preparation should be made so that dilatation and curetment could be carried out at the same time if found advisable. I think the curetment is important, for it enhances the nutritive effect of the dilatation—and the benefit from the procedure is due to its nutritive effect on the uterine tissues as well as to the removal of obstruction. The details of this operation have been given (pages 571 to 582).

If the patient is engaged to be married soon, the examination under anesthesia with the dilatation and curetment should not ordinarily be carried out. Wait until several months after marriage before employing any local measures. In the meantime pregnancy may take place, and that will do more toward a permanent cure of the trouble than the most radical operative measure. The marked effect of pregnancy in these cases of neurotrophic dysmenorrhoea is an additional indication that it is largely a nutritional trouble. Pregnancy exercises a most profound influence upon the nutrition of the uterus, both of the muscular tissue and of the mucosa. It has been argued that pregnancy and parturition produce the marked curative effect in these cases by overcoming the stenosis. Without doubt it does overcome the stenosis better than any other known measure, but, as has already been explained, the stenosis is only one feature of the trouble and the removal of the stenosis alone does not always effect a cure.

We may confidently expect considerable relief from thorough dilatation and curetment in the great majority of the cases. The duration of the improvement is variable. In a majority of the cases there is a return of the trouble after periods varying from a few months to several years, though it usually does not become so severe as it formerly was. In 95 cases, reported by H. A. Kelly, 32 were relieved (19 completely and 14 largely), with no return of the trouble—the period of observation extending from one to twelve years; in 7 cases there was relief for a period varying from one to nine years, the dysmenorrhoea finally returning; in 28 cases there was relief for a few months, but the dysmenorrhoea returned within a year; and in the remaining 28 cases there was no relief.

With the dilatation and curetment in these cases, I think it well to pack the dilated cervix firmly with gauze and leave the packing in place for forty-eight hours, so as to hold the internal os well open until the reparative infiltration begins, in order that the dilatation may be made as prolonged as possible. Along with this local treatment and following it, the various general measures previously recommended should be used.

In order to make the dilatation more lasting, H. D. Frye advocated the immediate use of a hard rubber drainage plug or intra-uterine stem. He states that immediately following the dilatation and curetment, "a Wylie drainage plug as large as will readily pass is inserted into the cervical canal and held in position by a Smith pessary. For a number of years I was accustomed to leave the plug in place for six days, but following the suggestion of Dr. Wylie I now allow it to remain from three to six weeks and the result is better. I usually keep the patient in bed two or three weeks after operation, and, if no discomfort be experienced, permit her to get up and go around, wearing the plug several weeks longer. I believe the use of the hard rubber drainage plug does much to add to the permanency of the relief obtained. When retained sufficiently long, it causes the formation of a cicatricial ring of tissue at the point of constriction, which insure patulency. I have not seen any bad results follow its use. In a few cases it causes pain, and on that account must be removed sooner than the specified time." It must be kept in mind, however, that when we leave a foreign body in the uterus for several days, particularly immediately after opening up the lymph spaces by curetment, we take great risk of causing inflammatory trouble, which may extend to tubes and become far more serious than the menstrual pain. In exceptional cases one may be justified in taking this risk.

The cases which are particularly amenable to dilatation are, of course, those in which the obstructive feature is prominent—i. e., the pain is severe and cramp-like, is most severe just as the flow is starting and largely disappears when the flow is well established. When there is a tendency to later return of the obstructive features of the dysmenorrhoea, then is the time for the use of partial dilatation or electricity—or stem pessary in suitable cases.

6. Partial Dilatation of the Cervical Canal in the Office. This is rarely advisable in the virgin for the reason that in such a patient it is difficult, painful, ineffective and subjects the girl to a pelvic examination without much chance of benefit. As a rule, when the measures previously mentioned fail, it is better to give the patient an anesthetic and dilate thoroughly and curet as above explained. Occasionally, however, in an unmarried woman this partial dilatation is practicable and gives much relief.

The patient is placed in the Sims posture, the Sims speculum introduced, the cervix caught and brought into view, and, with the antiseptic precautions necessary in all intra-uterine work, the graduated metal dilators (Fig. 101) are introduced into the cervical canal and past the internal os—beginning with the smallest size that the canal will accommodate and passing to the largest. After dilatation the vagina is again cleansed with the antiseptic solution, the speculum removed and the patient directed to lie down for a time after she gets home and to be rather quiet the remainder of the day. This dilatation is made each month just before the menstrual time. It is well to dilate four or five days before the flow is expected and then again the day before the flow. The closer the dilatation to the beginning of the flow, the better the effect, but, if one waits until the day before the expected flow for the first dilatation, the flow may come a day or two too soon, and thus the dilatation is missed entirely.

7. Stem Pessary or Wire Spring. Like partial dilatation, this is not applicable in most cases of dysmenorrhoea in the virgin until after the cervix has once been thoroughly dilated under anesthesia.

In the exceptional cases in which partial dilatation is practicable and effective temporarily, but must be repeated every month, the stem pessary or the wire spring may be used to maintain the dilatation. The use of the stem pessary must be attended with great caution. It was formerly used frequently and led to serious pelvic inflammatory trouble in many cases. The harmful results were so frequent that the use of the stem pessary was practically dropped by careful workers. Later it was found that in certain exceptional cases nothing would take its place, and that in these carefully selected cases and under proper technique it could be used with comparatively little risk.

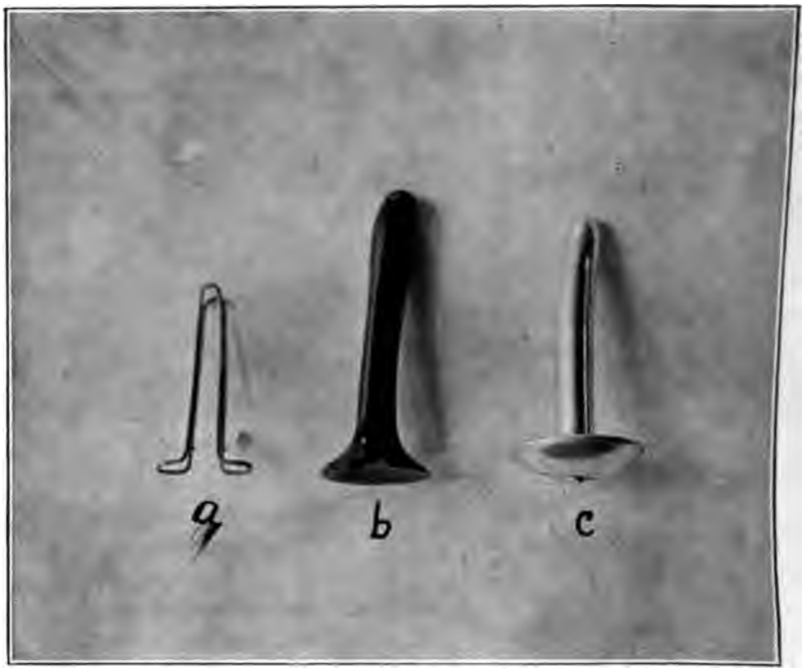

Fig. 708. Stem Pessaries: a, Outerbridge's cervical spring; b, hard-rubber stem pessary; c, aluminum stem pessary.

Its field of usefulness is to overcome the obstruction or stenosis in those cases without other pelvic lesion and in which this feature causes much suffering in spite of the employment of less undesirable measures. As was well emphasized by J. H. Carstens, who has done much to popularize the proper use of the stem pessary, it must never be used in a case where there has been any tubal or ovarian or other form of periuterine inflammation, or when there are adhesions. This is very important, for the use of a stem pessary in such cases may lead to serious results. Active inflammation in the uterus should also be excluded. The use of the stem pessary in the virgin has also the same objections that hold for partial dilatation or any other local treatment. Its use should as a rule be reserved for those cases in which the severe pain returns after thorough dilatation and curetment under anesthesia. In the married woman, where the objection to local treatment is not present and where also the cervix is likely to be softer and more easily dilatable, it is more frequently advisable, along with partial dilatation, as a treatment preceding thorough dilatation under anesthesia. The cases, however, must be carefully selected, as previously pointed out. A foreign body remaining in the uterus for weeks at a time is a hazardous condition, and such treatment should be employed only with a definite understanding of the indications and contra-indications, and then only in cases when the advisability of this treatment rather than some other is clearly established.

It must be kept in mind also that other therapeutic measures must also be used, as indicated by the conditions present. The established effect of the stem pessary is simply to overcome the stenosis—though it is possible that it has some stimulating effect on the local nutrition and on the muscular development (Carstens).

The pessary is applied after partial dilatation (page 881) and under the same strict antiseptic precautions used in sounding the uterus (page 87). The preferable time to apply it is a few days before the menstrual flow. If the menstrual pain for that period is relieved, the pessary may be left in place continuously for some months, providing no symptoms of irritation appear. The patient should take a mild antiseptic douche every day or two to prevent the possible growth of germs in the vagina that might ascend along the open cervical canal. The intra-uterine stem should always have openings or grooves along which the uterine secretion may freely escape. Useful forms are shown (Fig. 708). Outerbridge's intra-cervical spring tends to hold open the canal without occupying much of the lumen. A. H. Goelet, also, advocates the use of the intra-uterine stem pessaries and illustrates a glass stem with a hollow center and a flange at the bottom, to be held in place by vaginal gauze packing. He states that "it is never kept in the uterus, however, for a longer period than one week, and during that time the patient is confined to bed."

8. Electricity. Intra-uterine applications of electricity may give considerable relief in cases where the trouble returns after the cervical canal has been once thoroughly dilated.

The application of electricity may be carried out along with the partial dilatation just before menstrual periods, the electrode being used to effect the dilatation of the cervix. With the galvanic current, use the negative pole in the uterus, under the antiseptic precautions necessary in all intra-uterine treatment. The electrode may be used to dilate the canal. Introduce the small size electrode (page 354) as far as it will pass easily and then turn on the current, making the internal electrode the negative pole. Use a weak current, about 10 to 15 milliamperes. Make a steady gentle pressure on the electrode, and as the tissues relax about the electrode it passes further and further along the canal until it extends past the internal os. Then use the larger sizes until the cervix is well dilated. Then an intra-uterine application of the electricity is made, using 15 to 20 m. a. at first and continuing the application five to ten minutes. The applications are given once or twice weekly. If no result is observed from this, the strength is increased to 30 or 40 or 50 m. a. If there is a tendency to menorrhagia as well as dysmenorrhoea, it is well to follow the employment of the negative pole with the employment of the positive pole for 5 to 10 minutes. In cases that do not do well under the negative pole, it is well to employ the positive pole altogether. Some cases do better under the faradic current, and when one method does not suffice the various other methods may be tried.

Electricity has, of course, the dangers and contra-indications common to other forms of intra-uterine treatment. It has an admirable effect in some cases, while in other cases there is apparently no effect. It has given relief in many obstinate cases, and is worthy of trial in those cases where there is no objection to vaginal and intrauterine instrumentation. It is useful also in certain cases of that most obstinate form of menstrual pain—viz., membraneous dysmenorrhoea. L. H. Dunning relates a case which persisted in spite of a course of local applications, divulsion and curetment, abdominal section with breaking of adhesions, and excision of a diseased ovary and ventro-suspension, but finally yielded to intra-uterine applications of electricity—20 to 50 m. a. negative pole for five minutes, and the current slowly turned off and then on again with positive pole for five minutes. This was repeated twice weekly. The first menstruation after the applications showed less pain. At the second the membrane, which before had been a cast, was reduced to shreds. After the third menstruation no membrane passed. The report was made four months later, at which time there had been no return of the trouble, which before had been so severe and persistent in spite of all measures that the patient meditated suicide. The electricity was continued two or three times monthly as a preventive against recurrence. In the discussion, L. R. Brown reported a case of membraneous dysmenorrhoea which resisted repeated thorough dilatation and curetment, and the patient's suffering was so severe that she was a nervous wreck. As a last resort he used electricity—galvanic current, positive pole in the uterus, 12 m. a. continued for eight minutes, and repeated three times per week. At the first menstrual flow there was no improvement. At the second menstruation she passed no membrane, and after that the improvement was continuous, with no relapse during the several months the patient was under observation. The menstrual flow, which formerly lasted ten days, was reduced to four (effect of the positive pole).

In regard to choice of pole, remember that the positive pole has a constricting effect, diminishes congestion, dries the tissues about the electrode, and hence causes the electrode to stick where it is. It is not suitable for dilating a canal. Before using the positive pole the electrode should be carried all the way into the uterine cavity. The negative pole, on the other hand, increases congestion, softens the tissues and aids in dilating the canal (see also pages 356, 357).

9. **Excision of Tissue from Internal Os.** (Theilhaber Operation). The cervix is dilated thoroughly, and curetment is carried out if desired. The cervix is then split laterally, on each side, to near the internal os. Then with a small knife, inserted under the direction of the finger-tip carried to the internal os, a small wedge of tissue is removed from the anterior and from the posterior portion of the circulating ring. This wedge of tissue extends about one-third through the thickness of the uterine wall. The work is much facilitated by a knife of special design. The preliminary incisions, splitting the cervix, are then closed by sutures.

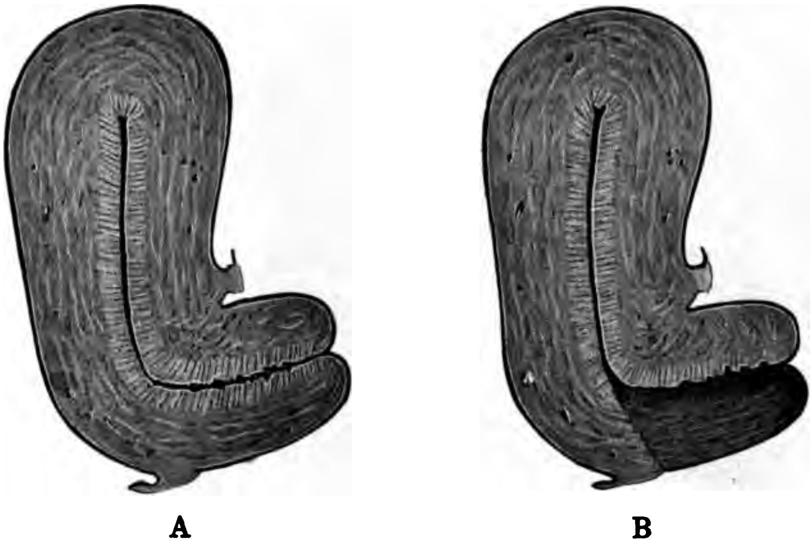

Fig. 709. Splitting the Cervix for Dysmenorrhoea (Dudley operation). A, showing the sharp bending of the canal from the anteflexion of the cervix; B, showing the unobstructed exit secured by splitting the posterior lip of the cervix and sewing it open.

This removal of wedges of tissue from the constricting ring at the internal os enlarges the opening and overcomes the obstruction. Series of cases have been reported with excellent results in nearly all cases as far as relieving the obstruction. I have employed the operation with satisfaction, but prefer the Dudley operation, which gives greater probability of permanently overcoming the obstruction. The small wedge-shaped grooves left by the excision of tissue in the Theilhaber operation are likely to fill up with scar tissue and the opening again become small. There is nothing about it to insure permanent enlargement of the opening.

10. **Splitting Cervix and Sewing it Open.** (Dudley Operation—Fig. 709).

This is applicable to those cases of anteflexion of the cervix in which the severe menstrual pain persists after thorough dilatation and curetment under anesthesia. In some cases in which the cervical anteflexion is particularly marked it is advisable to employ this as the primary operative procedure. The steps of the operation are as follows:

a. The cervix is dilated thoroughly and the uterus curetted in the usual way.

b. The posterior lip of the cervix is then split longitudinally up to the vaginal vault, the incision being carefully continued internally up to and past the internal os. The constricting ring about the internal os should be divided sufficiently to readily admit a finger. Care is necessary to avoid cutting too deeply into the uterine wall at this point, for, if the wall is cut through and the peritoneal cavity opened, there is danger of peritonitis. Ordinarily, there is no necessity for opening the peritoneal cavity. In some

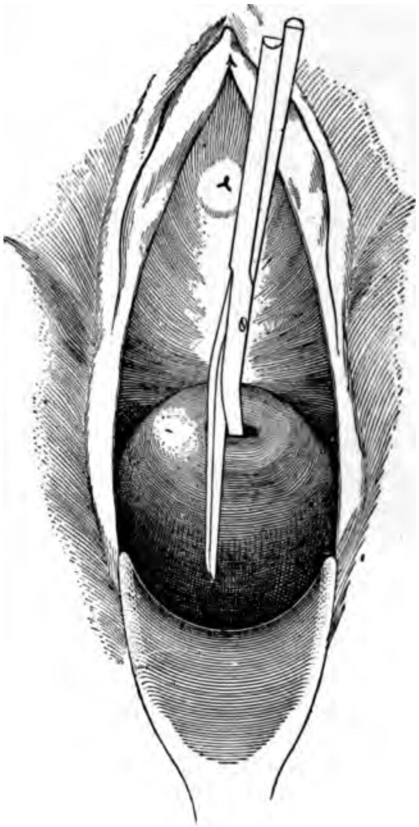

Fig. 710. Dudley Operation. Dividing the posterior wall of the cervix. (Dudley—*Practice of Gynecology*.)

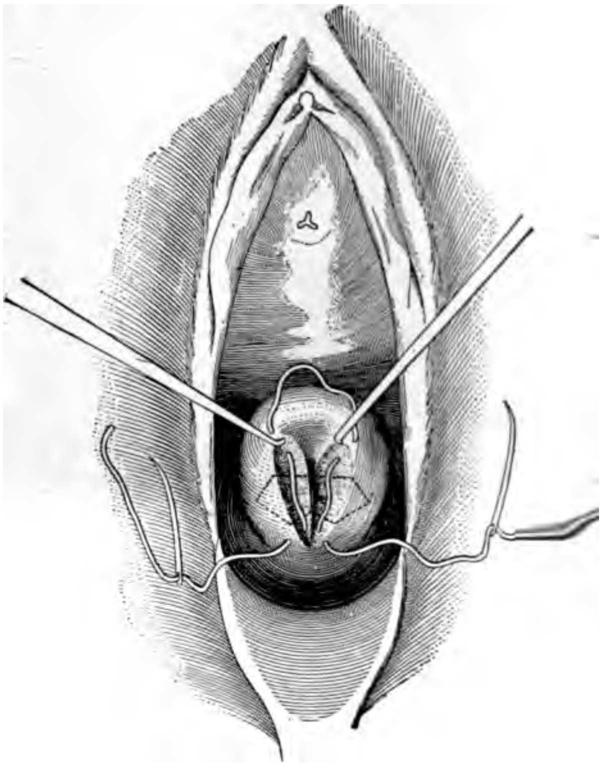

Fig. 711. Dudley Operation. The posterior wall of cervix divided and the principal suture passed. Before passing this suture a wedge-shaped piece of tissue is excised from the cervix on each side of the wound, as indicated by the dotted lines. (Dudley—*Practice of Gynecology*.)

cases, however, the posterior peritoneal pouch comes very low or the internal os is situated unusually high. In either case, it may be advisable to deliberately open the peritoneal cul-de-sac in order to properly complete the operation. The division of the intravaginal portion of the cervix may be most conveniently made with long scissors (Fig. 710). The careful division of the ring about the internal os is made with a bistoury under the guidance of the finger.

c. A wedge of tissue is then cut out of each lip, as indicated by the dotted lines in Fig. 711, so that each of the two cut edges will fold well on itself when the principal suture is tied.

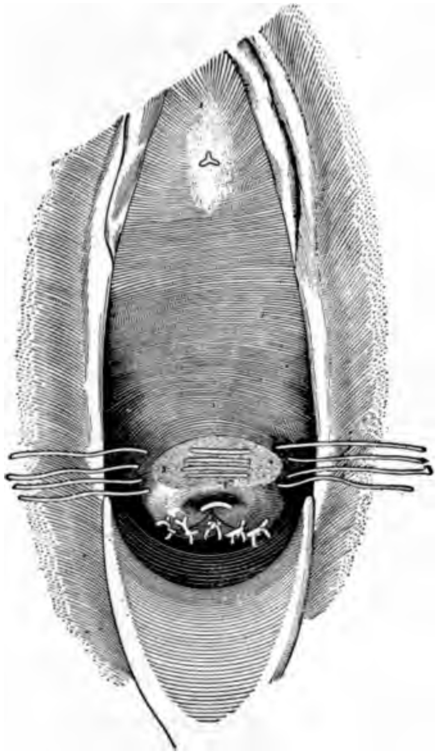

Fig. 712. Dudley Operation. The operative work on the posterior part of the cervix has been completed. Also, the redundant portion of the anterior lip of the cervix has been excised, and sutures passed for closing the wound (Dudley—*Practice of Gynecology.*)

d. A strong silk-worm gut suture is then passed as shown in Fig. 711. This, when tied, folds the cut surface of each lip upon itself in such a way that the ends (where the tenacula are caught in Fig. 711) are brought into the angle of the wound, and this tends to permanently hold apart the divided tissues about the internal os. Before this main suture is tied, however, secondary sutures of catgut should be passed in sufficient numbers to close the lateral portions of the wound and prevent any hemorrhage. The main suture is then tied, and lastly the secondary sutures. It is important to pass the sutures deeply enough to catch the bulk of the divided tissue to prevent subsequent oozing. In one of my cases persistent oozing followed the operation and this increased after several hours to a flow of blood, which firm vaginal packing failed to stop and which affected the patient's pulse, and assumed such serious proportions that I was called to the hospital in the middle of the night. I placed the patient in Sims' posture, removed all the packing and passed two or three strong catgut sutures deeply through the cervix in such a way as to effectually constrict all the tissue from which the bleeding might come. This was done without anesthesia and without disturbing the other sutures. This stopped the bleeding and the patient convalesced without further trouble.

e. In cases where the anterior lip of the cervix is very long it may be advisable to shorten it so as to allow the cervix to better assume its normal backward direction, instead of being again bent forward by pressure of the posterior vaginal wall. This is accomplished by excising the redundant portion of the anterior lip and closing the resulting raw surface by sutures passed transversely, as shown in Fig. 712. This draws a good wedge of tissue into the angle between the cervix and corpus uteri and tends to push the cervix back toward its proper direction.

11. **Abdominal Incision of Uterus.** This method (proposed by Dr. C. W. Barrett) consists of opening the abdomen by regular supra-pubic incision, making a longitudinal incision through the posterior wall of the uterus at the internal os, spreading this incision laterally so that it extends transversely and then suturing it in this position. It accomplishes enlargement of the internal os and consequent relief of the obstruction. As a rule, however, the patient may be sufficiently relieved without subjecting her to the danger of abdominal section. When the abdomen must be opened on account of accompanying disease of the adnexa or persistent retrodisplacement of the uterus, then this method of enlarging the internal os and correcting the forward flexion of the cervix may be considered.

12. **Operations for Diseased Adnexa.** Of course, where there is tubal or ovarian or other form of peri-uterine disease, that should receive proper treatment, operative or otherwise. In many cases, painful menstruation is simply a symptom of some such pelvic disease, and is relieved by removal of the same. In membraneous dysmenorrhoea, also, search should be made for chronic ovarian or tubal disease.

The removal of practically normal ovaries or ovaries that are not seriously damaged, for the relief of dysmenorrhoea, is to be most strongly condemned. There are many things that are far worse than some pain for a few days each month, and the removal of both ovaries in a young woman is one of them. Pain may be relieved temporarily by some of the various palliative measures already described, and then there is always the possibility that the pain will diminish or cease from the lapse of time and the continual employment of therapeutic measures. But when the ovaries are once removed they are gone irrevocably, and in a certain proportion of such cases the last condition of such patient, mentally and physically, is worse than death itself. Not that the removal of the functuating ovaries in a young woman necessarily or always has such a marked mental and physical effect, but in certain cases it has, and we can never be certain that such will not be the result in the particular case under consideration. Of course, it is possible that there may be certain rare cases in which, in spite of every other measure, the patient's suffering from menstruation is such as to justify this risk, but I have never met such a case.

(B.) DYSMENORRHOEA IN THE MARRIED WOMAN.

Causes.

This may be due to any of the twelve conditions already described as causes of dysmenorrhoea in the virgin. It may be due also to one of the following additional conditions:

13. **Infected endometritis,** acute or chronic.
14. **Salpingitis** (acute or chronic) or one of the other forms of pelvic inflammation (oophoritis, pelvis cellulitis, pelvic peritonitis).

A. M. Judd reported 217 cases of endometritis, accompanied with more or less laceration of cervix and pelvic floor, of which 108 suffered menstrual pain and 109 did not. He reports also 177 with diseased tubes and ovaries, of which 107 had menstrual pain and 70 did not.

In married women, membraneous dysmenorrhoea must be distinguished from early abortion and extra-uterine pregnancy, in both of which conditions there may be bloody discharge, with much pain and the passage of shreds of membrane. If this happens to take place near the menstrual time, the patient naturally supposes it is simply a menstruation somewhat delayed. In membraneous dysmenorrhoea there is usually a history of the expulsion of membrane at several menstrual periods, whereas with abortion there is the history of a missed menstruation and of morning sickness. Also the blood-clots are much more numerous in abortion, and with the membrane can usually be found a small sac and embryo. The bleeding from abortion persists indefinitely until the uterus is emptied, whereas in membraneous dysmenorrhoea it lasts only about the usual menstrual time. Microscopic examination of an expelled membrane or of shreds removed by curetment in abortion shows chronic villi. In extra-uterine pregnancy there is no previous history of membraneous dysmenorrhoea and the patient, previously regular, has usually gone over time for one or more weeks. The pain is due to intraperitoneal bleeding and presents the characteristics of the same.

Treatment.

The treatment during the flow is the same as detailed for the virgin (page 877). The treatment in the interval is determined by the local trouble found in the examination.

INTERMENSTRUAL PAIN.

The interesting subject of pain occurring at a certain time every month in the intermenstrual period has received considerable attention from investigators, and the conclusion has been reached that it is not an indication of any particular lesion, but is a pelvic neuralgia due to different conditions in different cases. In a careful study of the subject by Rosner, of France, it was found to be most common in arthritic subjects and was supposed to be due to some abnormal action of the ovaries. The periodicity of the pain—that is, its appearance each month a certain number of days after the cessation of the menstrual flow—is probably dependent in some way on the menstrual variations in blood pressure, and generally due to chemical or other influence proceeding from the ovaries (page 806), as indicated by Van de Velde. He shows that there is direct enlargement of the uterus at the time of the intermenstrual pain. Malcolm Storer, who reported 20 cases of his own and 25 additional cases collected from literature, found that in 10 of the cases there was a marked increase in the leucorrhoea at that time, indicating congestion of the uterus. The pain usually appears about midway between the menstrual periods; hence it usually corresponds with the lowest part of Stephenson's menstrual wave. In the 45 cases reported by Storer the pain appeared with regularity in all cases, practically every month unless pregnancy was present. In 22 cases it appeared always at the same time (in most cases about two weeks) after the beginning of last menstrual flow. In 13 cases there was a variation of two days, in four cases there was a variation of four days, and in two cases of irregular menstruation it would appear on a certain day before the menstruation. In 37 out of 41 cases the pain appeared from twelve to sixteen days after the beginning of the last menstruation and in 20 of them it began exactly on the fourteenth day. In 2 cases it came from the seventh to the tenth days, in 1 case on the seventeenth day and in 2 cases on the eighteenth day.

As to treatment, that should proceed on the same general lines as the treatment laid down for menstrual pain—i. e., the correction of general conditions first, and the employment of local measures, especially of operative measures, only in cases where there are well-defined indications and after other measures fail. As H. C. Coe has pointed out, the assumption that intermenstrual pain is always associated with cystic ovaries, and is therefore an indication for operation, is not tenable. Cystic disease of one or both ovaries is found in some cases, but the diagnosis of cystic ovaries or an operation for the same must always be based on distinct examination findings (page 888) and not simply on periodic pain.

IRREGULAR MENSTRUATION.

The menstrual flow may come too soon, the interval being only ten days or two weeks. Again, the flow may not come soon enough, running over time from one to two weeks. It is sometimes difficult to determine positively whether the irregular flow complained of is really menstruation or simply a bloody discharge from some disease of the vagina or uterus. Unless the bleeding resembles closely the menstrual flow in character and onset and duration, it should be regarded as a pathological discharge, and an examination should be made to determine its cause, that proper treatment may be instituted.

PRECOCIOUS MENSTRUATION.

Precocious menstruation is the appearance of menstruation at an early age. For genuine menstruation to take place, there must be considerable development of the genital organs, and this very rarely occurs before the age of ten. Rare cases have been recorded in all ages, even in infancy. It has been known to begin in infancy and continue regularly. There is usually precocious development of the breasts and of the external genitals.

Great care is necessary, however, in establishing the fact of precocious menstruation in a given case. Every stain of blood does not mean menstruation. The blood may come from some inflamed or irritated area or ulcer, or growth on the vulva or in the vagina, uterus, rectum or bladder. In infants a slight bloody uterine discharge occurs not infrequently within the first week or two after birth. It is not a menstrual flow and it soon disappears. Again, a red stain on the diaper, which the mother supposes to be blood, is often made by urates from a concentrated urine.

VICARIOUS MENSTRUATION.

Vicarious menstruation is the discharge of blood from other parts of the body at the menstrual time. The uterine discharge may or may not be wholly or partially suppressed. The bleeding usually takes place from the nose or from some open sore, though it may come from almost any mucous surface, such as the lungs or stomach, or bladder or rectum. Much more rarely some area of the cutaneous surface is affected, the axilla and the groin being the most frequent. At the affected site there appears an ecchymosis and later a distinct flow of bloody serum. The vicarious flow is likely to be irregular, appearing only at some menstrual periods. Allied closely to this is the monthly discharge of milk from the breasts sometimes observed.

Vicarious menstruation in any form is rare. Goffe records a very interesting case in which the vicarious discharge came alternately from the nose and the axilla, and seemed to be associated with periods of ungratified sexual desire. Vicarious menstruation is found principally in nervous women in which there is imperfect development of the uterus or imperfect performance of its functions. The treatment consists in the correction of any pelvic disease present, and in applications to the site of bleeding if necessary.

DYSPAREUNIA.

The two principal disturbances of sexual intercourse are dyspareunia (difficulty in coitus) and sexual impotence (absence of sexual orgasm in coitus).

Difficulty in coitus (dyspareunia) varies from a slight discomfort hardly noticeable to pain so severe as to make coitus unbearable.

CAUSES.

The more common causes of dyspareunia are as follows:

1. **Some Obstruction to Normal Coitus.** a. Imperforate hymen.—In such a case there would be present the history of amenorrhoea and also the disturbances that come from retained menstrual blood. You may think there would be a history of no coitus, and such is usually the case, but in some cases coitus has taken place through some adjacent opening—for example, through a dilated urethra.

b. Organic Stenosis of Vaginal Orifice.—The opening is large enough to permit the regular escape of menstrual blood, but it is not large enough to permit coitus. The obstructing tissue is so firm that it does not rupture as ordinarily on attempted coitus. This obstruction may be due to a very strong, firm hymen, or to some distinct malformation, such as a vaginal septum from double vagina. Usually with double vagina, each vagina is large enough for coitus or the septum is placed so far to one side that it does not interfere. But it may be so placed as to interfere decidedly with coitus and to require division. Again, an organic stenosis here may be due to scar-tissue from severe burn or other injury, or from laceration in labor, with extensive scar-tissue formation.

c. Spasmodic Stenosis at Vaginal Orifice.—In some cases there is marked hyperesthesia about the vaginal orifice, and every attempt at coitus causes unbearable pain or causes spasmodic contraction of adjacent muscles to such an extent that coitus is impossible. This marked hyperesthesia may be due to inflammation, such as vulvitis or vaginitis, or it may be due to sensitive abrasions about the vaginal entrance. In other cases it is due to that peculiar condition known as "vaginismus," a reflex contraction of the levator ani and adjacent muscles without apparent cause. In exceptional cases this is so severe and persistent as to altogether prevent coitus.

d. Severe Pain on Attempted Intercourse.—There is no stenosis or spasm, but just pain, so severe that coitus is impossible. This may be due to inflammation about the external genitals or inflammation within the pelvis.

2. **Simple Inflamed Abrasions About the Vulva.** This is not an infrequent cause of much suffering immediately after marriage. The small abrasions that naturally accompany rupture of the hymen at the first intercourse may become inflamed after a day or two, making subsequent coitus painful. This sometimes causes much alarm to the patient and her husband, who fear some serious trouble. The treatment is abstinence from coitus for a few days, with

the frequent use of some mild antiseptic wash (½% carbolic solution), followed by drying with absorbent cotton and the use of a soothing ointment, such as carbolized vaseline. It is well to keep the parts covered with a pad of absorbent cotton, to keep the clothing from contact with the painful areas and also to protect the abrasions from infection.

3. **Venereal Sores** (chancroid, syphilitic). These abrasions also may be found soon after marriage or at any other time. Care should always be taken not to give a positive prognosis in a case of abrasion or sore which has not yet had time to develop its characteristics.

4. **Gonorrhoeal Inflammation.** This is an altogether too common cause of painful coitus in the first few weeks following marriage. The pain may be due to the vulvar inflammation, or to the urethritis or to the vaginitis, or to painful abrasions or to the inflammation of the vulvo-vaginal gland of one or both sides.

5. **Other forms of inflammation** of vulva or vagina, or vulvo-vaginal glands.

6. **Inflammation of uterus** (acute or subacute).

7. **Inflammatory lesions around the uterus,** in which pain is caused by the impact of the male organ or by the sexual congestion. When the ovary is prolapsed into the cul-de-sac and bound there by adhesions, sexual intercourse may cause much pain. I recall one patient in whom it was finally necessary to open the abdomen, break up the adhesions and fasten up the prolapsed ovary in order to relieve the suffering in coitus. In the more serious pelvic inflammatory conditions, this is frequently a prominent symptom.

8. **Retrodisplacement of the uterus,** with inflammation. It is surprising how much displacement of the uterus, with forward projection of the cervix and apparent blocking of the vagina, can take place without occasioning any particular disturbance in coitus. But if inflammation appears, then dyspareunia is often marked—much more so than from the same amount of inflammation without displacement.

9. **Bladder or rectal diseases** occasionally cause painful coitus, particularly inflammatory diseases.

TREATMENT.

The treatment of dyspareunia is indicated by the **particular condition present,** as determined by a careful examination.

1. If there is some **malformation** about the vaginal orifice (imperforate hymen, thick hymen, septum in vagina, organic stenosis of vagina), the obstruction must be removed by the necessary operative measures.

2. If coitus is interfered with by **tender areas** about the vaginal entrance, or by ulcers or by hyperesthesia, the following measures may be employed:

a. Abstinence from sexual intercourse for one to three weeks.

b. Hot vaginal douches once or twice daily—medicated or unmedicated, depending upon the presence of discharge.

c. Laxatives as needed. Chronic constipation increases the congestion and irritability of the structures.

d. Some sedative ointment—for example, chloretone ointment (10%), applied two or three times daily.

e. Bromides, if there is much nervous irritability or apparent hyperesthesia of reflex centers.

f. When intercourse is again attempted, the patient should coat all the sensitive surfaces with a sedative ointment. The chloretone ointment above mentioned may be used or, if that is not effective, an ointment containing 2 to 5 per cent of cocaine.

3. If the vaginal opening is too small or there is the spasmodic condition known as **vaginismus**, stretching of the opening is to be employed in addition to the other measures just detailed. In some cases the tendency to spasm may be overcome by gradual stretching with a speculum every few days without anesthesia. In cases of organic narrowing it is advisable to pack the vagina in order to hold what has been gained and to aid in securing relaxation. If the gradual stretching without anesthesia fails, then the patient should be anesthetized and the vaginal opening thoroughly stretched. If the opening does not stretch well or the tendency to spasm is marked, it is well to divide the constricting structures and close the wound over them by sutures.

The treatment of the **other organic lesions** mentioned under causes is taken up in detail in the appropriate chapters.

SEXUAL IMPOTENCE.

The absence of strong sexual feeling in the woman during coitus does not assume the serious aspect it does in the man, with whom erection is necessary to insemination leading to pregnancy. The strong sexual feeling, with its consequent orgasm, in the woman is not at all necessary to impregnation, though it increases the probability of impregnation. From the history of cases of sexual disturbance it is evident that many otherwise normal women have little or no sexual feeling until some months or years after marriage—sometimes not until after one or more children are born. The response to sexual excitement apparently grows with the proper exercise of the sexual functions. This fact is important and may be used to prevent discord and disruption in families where either the husband or the wife is becoming dissatisfied and despondent because it is felt that there is not the proper sexual response.

Again, there are cases in which the wife is not in physical condition to respond. She has some chronic trouble which so saps her strength that she has not the vitality for this function. This loss of strength may be due either to some general condition or to some local condition, or to both. It is hardly necessary to name the various conditions. They comprise the whole list of debilitating conditions, both general and local.

The **treatment** of sexual impotence is directed toward removing any local disease, and toward building up the general health to the highest point—by a long course of tonics (including iron, strychnia, etc.), by change of environment, and by rest from care and worry and overwork, and too frequent sexual intercourse. The rest indicated is very important, for the things mentioned tend to keep the patient dragged down below par and in no condition to respond buoyantly and vigorously to any of the mental or physical requirements of daily life.

STERILITY.

Sterility is the absence of pregnancy under circumstances that normally lead to pregnancy.

It is said that about 10 per cent of marriages are without offspring, and the popular impression is that this sterility is nearly always due to some defect or disorder in the genital organs of the woman. The woman receives almost altogether the blame for the inability to produce offspring. In many cases the defect is with the woman, but in many other cases this blame is placed upon her unjustly. If we exclude from the definition of sterility those cases in which the failure to produce offspring is due to early abortions, or to prevention of conception, then sterility is in a large proportion of the cases, if not in the majority of them, due primarily to the husband. In that large class of cases in which the immediate cause of the sterility is gonorrhoeal inflammation involving the tubes and ovaries, the primary cause lies with the husband and on him must rest the blame for the childless home.

Sterility is sometimes defined as the inability to bring forth a living child, even though that the child were carried to full time. But I prefer to limit the term to the cases of absence of pregnancy. This is sometimes designated as "absolute sterility." Therefore, considering sterility from the gynecological standpoint, let the definition be "the inability to become pregnant." The patient may have had children or abortions in former years, or she may not. At any rate, she does not become pregnant now, though she earnestly desires to be so.

CAUSES.

In order to assist in determining the exact cause of the sterility in the various cases, it is well to consider what is necessary that a normal pregnancy may take place. It is necessary ordinarily (a) that healthy spermatozoa be deposited in the vagina, (b) that the spermatozoa remain healthy and penetrate into the uterine cavity and into the Fallopian tubes, (c) that a healthy ovum be formed in the ovary, (d) that it find its way into the Fallopian tube, where it can be fertilized by a spermatozoon, (e) that the fertilized ovum pass into the uterus, and (f) that it find there an endometrium suitable for its implantation and development.

Some of these conditions are not always absolutely necessary. At least five cases of conception, with labor at term, have taken place in patients where both Fallopian tubes and presumably both the ovaries were removed. Of course, some ovarian tissue was left. But the tubes may be removed and still the openings in some cases, without doubt, reopen and permit the ovum to pass. Fritsch ligated both Fallopian tubes in the middle with silk and still pregnancy followed three years later. Ashton reported the occurrence of pregnancy in the cervix following removal of the body of the uterus for fibromyomata, showing that even the body of the uterus was not absolutely essential to pregnancy. Again, pregnancy has occured in cases where penetration of the male organ into the vagina was impossible, showing that the spermatozoa may pass from the external genitals up to the uterus. But these are all very exceptional cases. Ordinarily each of the conditions mentioned is each a bar to pregnancy.

Assuming that the husband furnishes healthy spermatoza, the sterility may be due to the following causes:

1. **Some Conditions Interfering with Coitus.** These conditions are considered under "dyspareunia" (page 892).

2. **Laceration of Pelvic Floor.** When there has been a marked laceration, the vagina may be so relaxed and patulous that the semen is not retained in contact with the cervix long enough for the spermatozoa to pass up into the uterine cavity.

3. **Vaginitis or profuse discharge** in the vagina may interefere chemically with the vitality of the spermatozoa or mechanically with their progress to, or entrance into, the cervix uteri. In either case the chance of pregnancy is diminished.

4. **Some Obstruction in the Cervical Canal.** a. Stenosis of external os.—This may be found in the form of the congenital "pin-hole" os or it may be due to scar-tissue resulting from former injuries.

b. Stenosis at internal os.—This may be due to scar-tissue, but it is more frequently due to a sharp anteflexion of the cervix. It is often combined with a long pointed cervix and the "pin-hole" os already mentioned. This combination is a frequent cause of sterility in women who have never been pregnant, and it is usually accompanied with dysmenorrhoea.

c. Discharge.—There may be in the cervical canal an excessive secretion or discharge which interferes chemically with the vitality of the spermatozoa or mechanically with their journey upward.

5. **Some Displacement of the Uterus.** a. Retrodisplacement.—Retrodisplacement of the uterus may throw the cervix so far forward that the spermatozoa do not readily enter it.

b. Anteflexion.—Sharp anteflexion of the cervix may also throw the cervical opening too far forward.

c. Decided Prolapse.—Prolapse of the uterus may interfere mechanically with coitus or with the passage of the spermatozoa to the interior of the uterus.

6. **Some abnormal condition within the uterine cavity,** which interferes

with the passage of the spermatozoa to the tubes, or which fails to furnish a proper place for the implantation and nourishment of the fertilized ovum.

a. Simple endometritis.
b. Infected endometritis.
c. Tuberculosis of the endometrium.
d. Malignant disease (carcinoma or sarcoma).
e. Fibromyoma.

7. **Some affection of the Fallopian tubes** which interferes with the entrance of the spermatozoa into the tube or with the entrance of the ovum into the tube, or with the passage of the fertilized ovum from the tube into the uterus.

a. Inflammation.—Inflammation of the tube is the most frequent cause of sterility from tubal disturbance. This may be very slight—not enough to produce symptoms nor physical signs, but just enough to cause occlusion of one or both ends of the tube. It may vary all the way from this mild form to severe inflammation and disorganization of the tube, with extensive exudate and adhesions and abscess formation. Salpingitis, coming on after the first childbirth, or miscarriage, because of inflammation during the puerperium or because of gonorrhoea, infection brought by the husband, who was untrue to his wife during her confinement, is a prolific source of the so-called "one pregnancy sterility."

b. Tuberculosis.—Tuberculosis of tubes and adjacent structures.

c. Tumor.—A tumor of the tube or in the vicinity of the tubes, interfering with their functions.

d. Malformation of the Tubes.—This may consist in atresia of one or both ends of the tubes, or in blind passages and diverticula into which the ovum may wander and lodge. Or there may be abnormal openings in the wall of the tube through which the ovum may pass out into the peritoneal cavity and be lost.

8. **Some affection of the ovaries** that interferes with their function to such an extent that healthy ova are not formed or are not discharged in such a way that they pass into the Fallopian tubes.

a. Inflammation.—Inflammation of the ovary may be present in some of its various forms—infected oophoritis, simple oophoritis, cystic ovary, cirrhotic ovary or an ovary covered with exudate and adhesions.

b. Tuberculosis of ovaries and vicinity.

c. Tumors of the ovary.

d. Displacement of the ovary.—This may be so marked that the ova, instead of passing into a Fallopian tube, where they would be fertilized, pass into the peritoneal cavity and perish.

9. **Certain operations**—for example, removal of the uterus or of the Fallopian tubes, or of both ovaries.

10. **Douches,** which may interfere chemically or mechanically with the process of impregnation.

11. **General Conditions.** The general health may be so poor that all the or-

gans of the body are in too poor a condition to properly functionate, the genital organs among them. This is seen in some cases of marked anemia and emaciation, and general depression. On the other hand, it is present at times in patients who are inclined to stoutness. The effect of obesity in diminishing menstruation has been mentioned, and it sometimes has much the same effect on the capacity for impregnation. It has happened that sterility came on when a patient accumulated fat and disappeared promptly on reduction to her usual weight.

DIAGNOSIS.

A couple come to consult you because they have no children. Your problem is to find the cause of the sterility in this particular case. If the husband is an intelligent man, he will speak of any genital disturbance which he has had that might have a bearing on the subject. If no explanation is made, it is to be assumed that the husband is healthy, though this assumption should be confirmed as soon as opportunity occurs of questioning him when the wife is not present. Gross found the male directly at fault in about 16 per cent of the cases of sterility and De Sinty found the trouble to lie with the male in 25 per cent of the cases. The chief causes in the male were impotence, or absence of semen or absence of living spermatoza. If there is any question as to the ability of the husband to perform his part in the process of impregnation, a specimen of the semen should be submitted to microscopic examination, that the presence or absence of living spermatozoa may be positively established.

Assuming that the husband is healthy, the wife is questioned to secure the systematic gynecological history and to bring out any special facts that may have a bearing on the sterility. The history may point decidedly to some serious pelvic disorders, or there may be nothing in the history to indicate that the pelvic organs are other than normal. A thorough pelvic examination is then made to determine if there is any pathological condition in the genital tract.

The various conditions that may give rise to sterility, together with their diagnostic points, have just been detailed under "causes."

TREATMENT.

1. If there is **difficulty in coitus,** treatment for that will be required. This is considered in detail under dyspareunia (page 893).

2. There may be **anteflexion of the cervix,** with stenosis in the canal, a frequent cause of sterility in patients who have never been pregnant. Where sterility results from this condition, the treatment is dilatation of the canal, and for this there are three methods, as follows:

a. Partial Dilatation without Anesthesia.—The details of this procedure as employed for sterility are the same as described under Dysmenorrhoea, except that the dilatation is made immediately after each menstrual flow instead of before the flow. Just after menstruation is supposed to be the most favorable time for impregnation, so the canal is dilated then and it remains somewhat dilated for a week or so. The patient is directed to take no douches unless there is a troublesome discharge. If there is a discharge necessitating douches, a saline douche (a tablespoonful of table salt to two quarts of warm water) should be used and the douche should be taken in the evening—not in the morning. No antiseptic douche is allowed because it interferes with impregnation. This treatment may be repeated after each menstrual flow for several months, until pregnancy takes place or until it is apparent that no result is to be accomplished by this method.

In many cases more radical measures are necessary. In some cases, however, the simple dilatation just described carried out a few times will put the parts in such condition that pregnancy ensues, and it is worthy of trial in all cases where the canal dilates readily and there is not a profuse uterine discharge. In one of my patients, pregnancy followed a single such treatment made after several years of sterility.

b. Thorough Dilatation Under Anesthesia.—The patient is anesthetized, the cervix widely dilated and the interior of the uterus cureted. The curetment is advisable in practically all such cases, for the endometrium is usually not entirely healthy.

This thorough dilatation under anesthesia is employed in cases in which the previous method fails to produce results. It is advisable as the primary treatment in those cases where the cervix is small and sensitive. The dilatation thus secured is likely to persist in a measure over several months, and thus gives a good chance of pregnancy.

c. The Dudley Operation.—This is explained and illustrated under Dysmenorrhoea. It is employed for the purpose of permanently overcoming the obstruction in cases where the stenosis tends to recur after wide dilatation under anesthesia.

3. There may be **inflammation of the cervix,** with discharge, which interferes with the vitality or upward progress of the spermatozoa. Such a condition requires the treatment for endocervicitis (see chapter VI).

4. **Laceration of the Cervix,** with consequent cystic degeneration and discharge, may be present and requires the usual measures to allay the inflammation and lessen the discharge. If these palliative measures are not effective, the cervix should be put in better condition by an operation for repair—being careful in the denudation to leave a wide cervical canal, so that there will be no resulting stenosis. This removes the chronically inflamed and discharging surfaces, and thus increases the chance of the spermatozoa being able to penetrate into the uterus.

5. If there is marked **chronic endometritis,** that must receive appropriate treatment—which will include usually a thorough curetment.

6. **Retrodisplacement** of the uterus may be present. If so, it requires the treatment detailed in chapter VII.

7. **Tumors** in the uterus, or elsewhere in the pelvis, must be removed when it is at all probable that they are a factor in the sterility.

8. **Pelvic Inflammation** in one of its various forms may be found. If the inflammation is of recent origin and there are no serious symptoms, employ palliative measures. If the pelvic inflammation is improved thereby, these palliative measures may be kept up for several months in the hope that nature will repair the damaged organs sufficiently to restore their function. For the prognosis in regard to pregnancy after pelvic inflammation see page 728.

In chronic pelvic inflammation the chance of pregnancy may in some cases be decidedly increased by the removal of the disorganized portions of the Fallopian tubes and special treatment of the remaining part. The special treatment consists of splitting open the distal end of the stump of the tube for some little distance and sewing it open, and then establishing the patency of the tube, if practicable, from the distal end to the uterine cavity.

9. **If no local lesion** is found, improve the general health (by the use of tonics, and exercise and other appropriate measures) and make particular investigation as to the husband's condition. In regard to the patient's general health, if she is too stout, her weight should be reduced.

10. If the patient has been taking **douches** for the treatment of any disorder or as a routine measure, stop them. In cases where a douche is really necessary, direct the patient to employ the saline douche, and to postpone its use for at least eighteen hours after sexual intercourse.

LEUCORRHOEA.

There is normally a slight muco-epithelial discharge about the genitals sufficient to keep the parts properly moist. Abnormal discharge may be only an increase in the normal muco-epithelial discharge, or the discharge may be muco-purulent in character, or watery or bloody, as explained on page 3 For convenience the various kinds and discharge may be grouped under the two terms, leucorrhoea and bloody discharge. These disturbances are not diseases, but, like the other disturbances of function, are only symptoms.

Under the term "leucorrhoea" I include all varieties of pathological discharge from the genitals, except discharge containing blood.

CAUSES AND DIAGNOSIS.

Leucorrhoea due to extra-genital disturbances only and without local change is hardly probable, for the leucorrhoea is in itself evidence of some local departure from the normal functional activity. Of course, there are instances, particularly in virgins, in which the functional disturbance evidenced by the leucorrhoea is dependent largely on malnutrition or on pelvic congestion from extra-genital causes. The mild leucorrhoea found in anemic or cachectic patients may disappear when the patient is put in good general health. Again, in pelvic congestion from heart disease, or from some general cause, there may be present a mild leucorrhoea, which disappears when the functional pelvic congestion is corrected. In this sense leucorrhoea may be said, in some cases, to be due to extra-genital causes and its relief to depend upon treatment of same. In all but these exceptional cases, discharge from the genitals is due to one of the following local conditions:

Inflammation or Ulcer of Vulva. There is a history of discharge from the vulva, of burning or itching, and of frequent urination, with perhaps some pain. Examination of the external genitals shows redness, either general or localized to certain areas. There is tenderness and discharge, and also evidences of the cause of the inflammation or ulcer. If the trouble is an ulcer, it may be simple, chancroidal, syphilitic, tubercular or malignant..

Acute Vaginitis. There is a history of a free yellow discharge of short duration, irritation of vulva and frequent urination, with some burning. Examination shows a yellowish discharge and redness of vulva. If gonorrhoeal, there is usually involvement of the vulvovaginal glands; also the discharge shows gonococci. The vaginal walls are rough and hot and tender—too tender to admit of satisfactory bimanual examination. When exposed with the speculum, the vaginal walls are reddened and there is not enough discharge from the cervix to account for the leucorrhoea.

Chronic Vaginitis. This occurs principally in children. There has been a yellow discharge for several weeks or months, with irritation of the vulva and some bladder irritability. Examination shows a yellow discharge and redness of the vulva, with more or less tenderness. The discharge should be examined for gonococci. If the patient is a child, no vaginal examination is made. If an adult, examination shows tenderness and chronic thickening and roughness of vaginal wall, usually most marked in the posterior fornix. Speculum examination shows redness of vaginal wall, either general or in patches, and there is not enough discharge from the cervix to account for the leucorrhoea.

Adhesive Vaginitis. This occurs principally near or after the menopause. There is a history of chronic discharge, with irritation of the vulva, and sometimes bladder irritability. On examination it is found in most cases that the discharge is slight and is sticky or "gluey" in character, though in exceptional cases it is free and purulent. In some cases there are scratch-marks, resulting from the patient's attempts to overcome the pruritus. On vaginal examination the vaginal walls are found adherent in spots, especially at the upper part of the vagina. If the adhesions are recent, they separate easily, with some bleeding. If the adhesions are old, they are firm, and in some cases the vagina is almost obliterated by the process. When the walls are separated with the speculum, in the less advanced cases, irregular spots may be seen which are raw and bleed slightly.

Ulcer of Vagina. This may be simple, chancroidal, syphilitic, tubercular, or malignant. There is a history of an acute or chronic discharge and probably also of other evidences of the disease causing the ulceration. Examination shows a discharge about the vulva and more or less irritation of the surfaces. When making the vaginal examination, the indurated edges or base of the ulcer may be felt. The speculum exposes the ulcer to view, and further investigation shows it to be the sufficient cause of the discharge.

Acute Endocervicitis. There is a history of a tenacious, stringy discharge of recent origin. There may or not be irritation of the external genitals. Vaginal and bimanual examination shows nothing special. Speculum examination shows a stringy, tenacious discharge coming from the external os. There is also congestion of the cervix and usually erosion about the external os,

Chronic Endocervicitis. There has been a discharge for a long time. Vaginal and bimanual examination shows no evidence of involvement of the corpus uteri or the adnexa. Speculum examination shows a very tenacious, stringy, mucopurulent dicharge from the external os, with more or less surrounding erosion. In many cases there has been also severe laceration of the cervix, the evidences of which may be felt and seen.

Laceration of Cervix. In these cases the discharge is not due so much to the tear itself as to the subsequent eversion, and irritation and chronic inflammation. The various appearances presented by the lacerated cervix are shown in Figs. 437 to 442.

Ulcer of Cervix. Such an ulcer may be simple, chancroidal, syphilitic, tubercular or malignant. There is a history of leucorrhoea. In the vaginal examination the ulcer of the cervix may or may not be felt, depending on whether or not there is any induration in the edges or base. When the cervix is exposed with the speculum, the ulcer is seen, presenting a distinctly marked margin and a base of granulation tissue.

Malignant Disease of Cervix. This may appear in the form of an ulcer, with indurated margins and base, or as a papillary growth from some spot on the cervix or within the cervix. For the various appearances of beginning malignant disease of the cervix see Figs. 443 to 447.

Polypi of Cervix. Polypi of the cervix of various kinds may give rise to considerable leucorrhoea, though usually a bloody discharge is the prominent feature in these cases (page 562).

Acute endometritis, whether gonorrhoeal or due to pus infection following labor or miscarriage, gives rise to free discharge. There is a history of recent labor or miscarriage, or instrumentation or gonorrhoea, or a history of chronic endometritis due to one of these causes. Examination shows a free discharge, the character of which points to the cause of the trouble, as explained in chapter VI. Vaginal and bimanual examination show tenderness of the body of the uterus, but no tenderness around the uterus unless there is complicating trouble. Speculum examination shows a free purulent discharge coming from the uterus.

Chronic Endometritis. There is a history of chronic leucorrhoea. Examination shows nothing in the vagina or cervix to account for the discharge. The body of the uterus may be somewhat enlarged or tender, though not necessarily so. Through the speculum it is seen that the discharge comes from the uterus and not from inflammation of the vaginal wall. The character of the discharge indicates that it comes largely from the endometrium and not from the cervical glands.

Retrodisplacement of uterus causes leucorrhoea by causing chronic irritation of the endometrium, resulting in a chronic endometritis.

Fibroid of uterus causes leucorrhoea by causing chronic irritation of the endometrium, both by direct pressure and by interference with its blood supply.

Cancer of corpus uteri causes leucorrhoea by the breaking down of the cancerous area and also by the chronic irritation of the adjacent endometrium.

Periuterine disease causes leucorrhoea by causing chronic congestion of the endometrium, with the resulting endometritis.

Functional congestion of the uterus or pelvis causes leucorrhoea by the nutritive and so-called inflammatory changes in the endometrium and cervical mucosa resulting therefrom.

TREATMENT.

For the purpose of considering treatment, it is convenient to divide the cases of leucorrhoea into three classes.

1. **In the Virgin**. Leucorrhoea is not an infrequent complaint in the virgin. It may be due to local malnutrition and loss of tone from marked anemia (dependent on chlorosis or other cause), it may be due to pelvic congestion from obstruction to circulation by heart disease or liver disease, or other extra-genital affection, or it may be due to functional pelvic congestion incident to the occupation or other condition mentioned under Menorrhagia (page 864). In the virgin it is assumed that the leucorrhoea is due to one of these causes, unless evidences of decided local disease are present, and treatment is given accordingly. The treatment consists of the following measures:

a. The administration of iron and other tonics internally and the employment of the other measures mentioned in the tonic regimen for the treatment of anemia accompanying amenorrheoa (page 854).

b. The use of laxatives and other measures required to overcome any chronic constipation that may be present.

c. The administration of some uterine astringent for the purpose of diminishing the congestion of the endometrium. The ergotin capsule (see Formulae) is a very good preparation for that purpose. The uterine astringent is specially indicated for those cases accompanied with excessive menstruation.

d. Where the discharge persists after the patient has been put in good general health by the measures mentioned above, a vaginal douche may be ordered to be taken once or twice daily. It is well to start with a mildly astringent solution, such as the alum douche (one teaspoonful of powdered alum to two quarts of hot water) or the aluminum acetate douche (see Formulae), and advance to the stronger astringents, such as the zinc sulphate and the alum douche (see Formulae), if necessary.

e. Local examination, with such subsequent treatment as is necessary for the particular local lesion found. In the virgin this is reserved for those cases in which the discharge persists after the employment of the measures above given or in which the evidences of local disease are so marked that an examination at once is necessary.

2. **With Marked Local Lesion.** In the married woman, who comes complaining of leucorrhoea, an examination is ordinarily made at once in order

to determine if any marked lesion is present. In these cases, and also in exceptional cases of the previous class in which an examination is finally necessary, it may be found that there is a decided local lesion, or that, on the other hand, the parts show no decided lesion.

When a marked lesion that constitutes sufficient cause for the leucorrhoea is present, it should, of course, receive the appropriate treatment. The various lesions that may cause a discharge from the genitals have just been mentioned in the preceding pages, and the treatment required for each lesion is detailed in the chapter dealing with such lesion. In many of these cases the leucorrhoea is a very subordinate feature, the treatment being principally for the relief of more serious symptoms. In the case of many patients with a chronic uterine discharge, in which there is a more serious disorder requiring some operative procedure, it is well to curet the interior of the uterus at the same time in order to check the discharge.

3. Without Marked Lesion. In some patients with troublesome leucorrhoea the examination shows no marked lesion. There is probably a mild chronic endometritis or hyperplasia of the endometrium, but there is nothing that gives rise to any symptoms other than the leucorrhoea, with perhaps a slight tendency to excessive menstrual flow.

In such a case employ the measures just mentioned for treatment in the virgin. If these do not suffice, then a few astringent intra-uterine applications (see page 321) may be made if the cervix dilates easily, or a few intrauterine applications of electricity. If the leucorrhoea still persists to a troublesome extent, thorough curetment of the interior of the uterus under anesthesia should be employed. The curetment should be followed by a general and local tonic regimen, that the new endometrium may develop under bettered conditions.

In suspicious cases of persistent uterine discharge, the material removed in the curetment should be submitted to microscopic examination, that the presence or absence of malignant disease of the endometrium may be positively determined.

BLOODY DISCHARGE.

Bleeding not connected with menstruation may vary from a streak of blood, or a slight coloring of a muco-purulent discharge, to a free flow of blood. Occasionally there is a hemorrhage sufficiently free to threaten the patient's life. In most cases, however, the bloody discharge is slight and irregular, and is of serious import only because it may have a serious condition for its cause.

CAUSES.

Any of the following disorders may cause a bloody discharge from the genitals, the character of the discharge varying from a muco-purulent discharge, only streaked with blood, to a profuse flow of blood and clots. All of the conditions mentioned in the first part of the list give rise, also, to leucorrhoea and are mentioned under it. The other conditions occur with pregnancy and must be thought of whenever a bloody discharge is complained of:

Inflammation or Ulcer of Vulva.
Acute Vaginitis.
Chronic Vaginitis.
Adhesive Vaginitis.
Ulcer of Vagina.
Acute Endocervicitis.
Chronic Endocervicitis.
Laceration of Cervix.
Ulcer of Cervix.
Cancer of Cervix.
Polypi of Cervix.
Acute Endometritis.
Chronic Endometritis.
Retrodisplacement of Uterus.
Fibroid of Uterus.
Cancer of Corpus Uteri.
Periuterine Disease.
Functional Congestion.

Threatened Miscarriage. The patient may have missed the menses only a few days or may be several months pregnant. Threatened miscarriage is usually accompanied by considerable pelvic pain. In exceptional cases there may be a bloody discharge for several hours, or a day or two, before pains begin. In some cases, by questioning the patient, it will be found that, failing to come unwell at the proper time, she has been taking medicine to produce an abortion ("to bring on the flow").

Miscarriage. Here there are sharp, cramp-like pains, with the expulsion of blood-clots and pieces of membrane or a formed fetus, depending on the period of pregnancy at which the accident happens. Then the pain subsides and after a few days the bloody discharge ceases.

Incomplete Miscarriage. The uterus is not entirely emptied and the retained remnants cause a persistent bloody discharge for one or two weeks after it should have stopped, and there is resulting subinvolution of the uterus. The blood may pass as a muco-sanguinous discharge or in clots. It may disappear when the patient stays in bed, to reappear when she gets up. This is perhaps the most frequent cause of persistent bleeding in women of the child-bearing age. There is usually little pain after the miscarriage has taken place. The principal symptom is the bleeding, with the resulting anemia and weakness. If infection takes place, the symptoms of sepsis are added.

Placenta Praevia. Bleeding from this cause does not usually take place until the pregnancy has advanced so far that the diagnosis is perfectly clear.

Laceration of Cervix with Pregnancy. The cervix is lacerated, everted and eroded, and there is added the softening and congestion from pregnancy. There are no pains such as accompany miscarriage. There may be some slight pain and uneasiness in pelvis, which is relieved by lying down. The bloody discharge persists, off and on, without apparent evidence of threatened miscarriage or other intra-uterine disturbance.

Tubal Pregnancy. The rupture of a tubal pregnancy, or a tubal abortion, is nearly always followed in a few days by an irregular bloody discharge, which may persist for several days or several weeks. In some cases pieces of membrane are associated with the bloody discharge. There are also the other evidences of tubal pregnancy (page 773).

Myopathica Hemorrhagica. This is a symptomatic term used to designate the condition in certain uteri that bleed persistently in spite of repeated curettage, without sufficient reason so far as any gross lesion is concerned. On microscopic examination of such uteri, practically all are found to have have marked disease of the vessel walls—in some instances local, in others general.

TREATMENT.

In considering the treatment of bloody discharge from the genital tract, it is well to divide the cases into two classes—those with an evident local lesion and those without evident lesion.

1. With Marked Local Lesion. In a certain proportion of the cases in which the patient comes complaining of a bloody discharge, the ordinary gynecologic examination will show a marked lesion of the external genitals, or the vagina or the uterus, of such nature as to account for the bloody discharge. The treatment required is the regular treatment for the particular lesion, the details of which are given in the appropriate chapter.

When there is free hemorrhage from the uterus, a firm vaginal packing or tamponade may be used for temporary effect. This is best applied with the patient in the Sims posture and the perineum retracted with the Sims speculum. The gauze or cotton used for the packing should first be dipped in an antiseptic solution and then squeezed as dry as possible. Gauze or cotton thus prepared is much more effective for checking hemorrhage than when perfectly dry. No firm vaginal packing should be employed in a pregnant patient as long as there is a chance of preserving the pregnancy, as such a packing might cause a miscarriage.

2. Without Marked Local Lesion. The ordinary gynecologic examination shows no decided lesion. It is evident that the bloody discharge comes from within the uterus, but the history and examination show no other sign of uterine disease, except perhaps some menstrual disturbance. What is to be done for such a patient?

The following treatment should be employed:

a. Tonics. It is important to overcome any marked anemia or general malnutrition by the administration of iron and other internal remedies as indicated and the employment of the other measures of an effective tonic regimen.

b. Laxatives. The careful regulation of the bowels is needed, both for the local effect in diminishing pelvic congestion and for the general effect in improving nutrition.

c. Uterine Astringents. Ergotin or stypticin should be given regularly, three to four times daily, for a period of two or three weeks in order to secure the full hemostatic effect. This is to some extent a diagnostic measure as well as a therapeutic measure. If the bloody discharge is due simply to subinvolution or a mild endometritis, it is likely to cease under these measures and remain away permanently if the treatment is continued for some months—long enough to restore the general health and the local tone. If the bloody discharge persist in spite of above measures continued for a few weeks, it means that there is some decided change in the endometrium. This may be only chronic inflammation or it may, on the other hand, be beginning malignant disease. In such a case the interior of the uterus should be thoroughly curetted under anesthesia and the curettings submitted to microscopic examination. If the trouble is inflammatory, this is the most effective therapeutic measure. If the trouble is malignant, the diagnosis is thus made early, at a time when removal of the uterus will probably effect a cure.

d. Vaginal Douches. Douches are usually given along with the three measures previously mentioned. If there is a purulent discharge, a strong antiseptic is used—for example, the bichloride douche. If there is no decided purulent discharge, an astringent is used, such as alum, or zinc sulphate and alum (see Formulae).

e. Intra-uterine Applications. In some cases a few intra-uterine applications may be made for therapeutic and diagnostic effect. Copper sulphate (10% solution) is the preferable astringent to use. In simple hyperplasia or mild inflammation it tends to stop the bleeding. In beginning malignant disease the bloody discharge persists.

f. Curetment. When there is a bloody discharge that persists off and on, in spite of other measures employed for a few weeks, then thorough curetment under anesthesia is indicated as a diagnostic and therapeutic measure. In cases where the cervical canal is wide, or where it dilates easily without much pain, some scrapings from the endometrium may be obtained in the regular office examination by means of the small exploring curet (Fig. 101). If such scrapings show malignant disease, the diagnosis is thus established without anesthesia. If the scrapings do not show malignant disease, then curetment under anesthesia is indicated, for in such a case malignant disease cannot be excluded until a thorough curetment is made and all the scrapings examined. If no malignant disease is found, but the bleeding recurs, a second curetment with examination of the scrapings is indicated. If the bleeding recurs only at long intervals, repeated curettage may be employed with much benefit, provided malignancy can be positively excluded.

g. Hysterectomy. If malignant disease is present, hysterectomy at once is, of course, indicated. If no malignant disease is present, but still the bleeding recurs soon after curetment, and especially after repeated curetment, hysterectomy may be necessary. It is clearly indicated where the uterine wall is damaged permanently and to a serious extent, by scattered fibroid nodules, by chronic metritis (sclerosis) or by the condition designated as "myopathica hemorrhagica."

CHAPTER XV.

INVASION OF THE PERITONEAL CAVITY

For the Treatment of Gynecologic Diseases.

In the treatment of certain gynecologic affections it is necessary to invade the peritoneal cavity. This invasion of the great peritoneal sac in the center of the body necessarily carries with it much risk to the patient. In the preantiseptic days the mortality was great—so great that the operation was but rarely resorted to. By modern antiseptic and aseptic methods, however, the mortality has been reduced to a very small per cent. But though the mortality of the operation is small, we must not forget that there is a mortality due directly to the operation.

The danger varies much in different cases, depending on the particular form of disease present and on the condition of the patient at the time of operation—but there is some danger in every case. I call particular attention to this because some physicians seem prone to overlook, or at least fail to give proper weight to, the fact that occasionally a patient, with everything apparently favorable, will die, and no one can promise any patient absolutely that she will survive. One may say, in a favorable case, that the risk is very slight and that in all probability the patient will go through the operation and convalescence without trouble. But though the risk is slight, it is nevertheless a risk, and the patient or her friends must so understand it. Such necessary explanation to the patient or her relatives is made with much better grace before operation than afterward.

The peritoneal cavity may be readily entered in two ways—by incision through the anterior abdominal wall (abdominal section) or by incision through the vaginal wall (vaginal section).

ABDOMINAL SECTION.

Abdominal section is incision into the peritoneal cavity through the abdominal wall. This is known also as "celiotomy" and as "laparotomy," and as "suprapubic section." These terms all refer simply to the incision through the abdominal wall into the peritoneal cavity and not to the subsequent operative manipulations carried out within the cavity.

The incision may be located at any part of the wall—in the median line or laterally. The direction of the incision may be longitudinal or transverse or oblique, or a combination of these directions.

There is usually some additional operative procedure carried out after the peritoneal cavity is opened, and this additional procedure frequently gives the name to the whole operation—for example, ovariotomy (abdominal section with removal of an ovary or an ovarian tumor), myomectomy (abdominal section with removal of a fibromyoma of the uterus), abdominal hysterectomy (abdominal section with removal of the uterus).

INDICATIONS

For Abdominal Section.

The most common indications for abdominal section in gynecologic work are as follows:

1. Ovarian tumors.
2. Broad ligament tumors.
3. Uterine fibromyomata with serious symptoms not yielding to minor measures. The abdominal operations in these cases are myomectomy, supravaginal hysterectomy, and total abdominal hysterectomy.
4. Cancer of the uterus (total abdominal hysterectomy).
5. Extra-uterine pregnancy.
6. Acute pelvic inflammation which spreads in spite of other measures and threatens life.
7. Chronic pelvic inflammation with a collection of pus high in the pelvis, as in pyosalpinx.
8. Chronic pelvic inflammation with a large amount of exudate and persistent troublesome symptoms.
9. Chronic pelvic inflammation without decided exudate, if everything else fails to relieve the pelvic distress.
10. Pelvic tuberculosis, if other measures fail to produce decided improvement.
11. Adherent retrodisplacement of uterus or persistent prolapse, causing troublesome symptoms and not yielding to less dangerous measures.
12. Obscure or doubtful pelvic disease which, in spite of other measures, threatens the patient with death or with chronic invalidism (exploratory abdominal section).

CONTRA-INDICATIONS.

The more common contra-indications to abdominal section are:

1. Marked nephritis, especially chronic interstitial nephritis.
2. Diabetes mellitus.
3. Inoperable cancer or advanced pulmonary tuberculosis.
4. Any chronic disease, general or local, causing marked weakness and lessening the patient's resistance.
5. Acute disease that may be aggravated by the operation.
6. Dermatitis within the operative field.

All these contra-indications are of course only relative. There may arise circumstances demanding the operation at once in spite of contra-indications—that is, circumstances in which the danger of delay would be greater than the danger of immediate operation. But when the case is not one of extreme urgency, the operation should be postponed until the complicating condition can be corrected and the patient placed in better condition.

Pregnancy increases the danger of abdominal section very decidedly, but it is not often a contra-indication for the reason that the disease requiring operation (for example, a large tumor or an abscess) precludes the full development of the fetus or makes the dangers from advancing pregnancy greater than those from immediate operation.

DANGERS

Of Abdominal Section.

The immediate dangers of an abdominal section are three:

1. Failure of the vital forces to stand the shock of the operation. This shock is due principally to (a) the loss of blood, (b) the handling of intraperitoneal structures and (c) the anesthesia.
2. Failure of the vital organs (heart, lungs, kidneys and gastro-intestinal tract) to perform the extra work thrown on them in the first few days following the operation.
3. The development of infection, causing general peritonitis or localized suppuration.

PREPARATIONS

For Abdominal Section.

In order to reduce to a minimum the dangers of the operation, careful preparation is required.

The operation should, when possible, be carried out in the clean, well-arranged operating room of a hospital, even though the patient has to be moved a considerable distance to obtain the requisite hospital facilities. Abdominal section is too serious an operation to be undertaken in the home if the patient's condition will permit her removal to a hospital.

When the operation must be performed at the home of the patient, the room should be made as clean and free from dust as possible by the following steps:

a. One or two days before operation remove the bric-a-brac and superfluous furniture and sweep the walls, ceiling and floor thoroughly.

b. The carpet may be removed, leaving the bare floor, or, after sweeping the carpet well, it may be covered completely with oilcloth well tacked down.

c. All the wood-work should then be thoroughly scrubbed with soap and water and afterward with an antiseptic solution.

The further preparations for the operation may be divided into three parts as follows:

A. Preparation of the patient.
B. Preparation of instruments and dressings.
C. Preparation of operator and assistants.

A. Preparation of the Patient. The patient, having been subjected to a careful general examination, including urine analysis, to exclude contra-indications, is sent to the hospital one or two days before operation, that the proper preparation may be carried out. Of course there are cases of rapidly spreading pelvic inflammation, or of intra-abdominal hemorrhage or injury, in which the abdomen must be opened at the earliest possible moment. In such a case there is no time for preliminary preparation—careful immediate sterilization is carried out and the abdomen is then opened. But when the case is not an emergency one, the preliminary preparation should be made. It gives the patient a decidedly better chance of complete and uninterrupted recovery.

The purposes of this preliminary preparation are:

a. To tone up the patient's nervous system so that she will be better able to stand the operation.
b. To see that the kidneys are in good working order, and to prepare the urine for possible catheterization.
c. To nourish the patient so as to limit intestinal decomposition, and to empty the intestine tract well just before operation.
d. To prepare a sterile field for the operative work.

These desired results are secured by a program ordinarily about as follows, supposing the time for operation to be an early morning hour:

1. Nervous System and General Measures. For two or three days before operation the patient is given strychnia sulphate 1-40 gr. by mouth every four to eight hours, depending upon the amount of stimulation needed. If the patient's stomach is much disturbed, this may be given hypodermatically. Such other medicines should be given as are indicated by pain or nausea, or cough or other symptoms. If there is a vaginal discharge, give an antiseptic douche once or twice daily.

2. Kidneys and Urine. Determine whether the kidneys are doing their work well. Make the regular analysis of the urine, and, when indicated, the special examinations. As the patient may have to be catheterized after operation, it is well to give some urinary antiseptic for a day or two before—such, for example, as urotropin, 5 grains in glass of water every eight hours. Have the patient take water rather freely.

Formerly I took particular pains to thoroughly saturate the patient with water before operation, for the purpose of aiding the kidney action after operation and diminishnig the thirst, but have discontinued the practice as a routine because I found certain drawbacks—the principal one being that it interfered with spontaneous urination after operation. The avoidance of catheterization is much to be desired and can usually be accomplished, provided the bladder does not fill until the patient has well recovered from the anesthesia. In the water saturated patients the urine is secreted so rapidly that frequently the bladder becomes distended before the reflexes are sufficiently established to bring about spontaneous urination. In certain cases, however, where the kidneys are defective, I still employ it.

3. Diet and Laxatives. Light diet is to be given up to and including noon of the day before operation, then liquids only, but with water in abundance. After midnight, just preceding the operation, nothing is to be given by mouth but water—the water may be continued up to within an hour of the operation. A dose of castor oil (1 to 2 ounces) is to be given about 3 P. M. the day before operation, and the next morning an enema until the water returns clear.

The idea is to have the intestinal tract in as near a normal condition as possible (hence no abnormal putrefaction), with simply a good clearing out by a non-irritating purgative just before the operation. Experience has shown that this simple method of preparation brings the patient to the operating table in better condition and causes less disturbance after the operation than the prolonged dieting and purging formerly employed. The latter upset the functional routine of the intestine, disturbed the normal peristalsis, increased the intestinal irritation and putrefaction, and reduced the patient's strength.

When there are complications that may necessitate resection of the intestine or opening of the stomach, then, of course, the usual preoperative measures for approximate sterilization of the upper intestinal tract should be employed.

4. Sterilization of the Field. Five to fifteen hours before operation (most conveniently the afternoon or evening before) cover the whole abdomen with a poultice composed of absorbent cotton soaked in a solution of green soap in warm water. The cotton should be applied sufficiently wet so that the skin will be thoroughly soaked by the soapy water. This loosens all the dead epidermal scales and all extraneous particles on the skin and makes the subsequent shaving much more effective as a cleansing process. After the soap solution has been on half an hour to an hour, remove it and shave the abdomen. Then scrub the abdomen well with absorbent cotton or a very soft brush, using warm water and green soap or ethereal soap. At this point your hands should be again sterilized. Then wash off the soap solution with sterile water. Then wash the abdomen carefully and vigorously with alcohol (about 80%), using sterile cotton balls. Then wash with bichloride solution (1-2000), using sterile cotton balls. Then apply a compress of absorbent cotton moistened with bichloride solution (1-5000). This compress is to remain in place until after the patient is under the anesthetic, or, if preferred, the bichloride dressing may be removed a short time before anesthesia and the cleansing process repeated. In this process of sterilization special attention must be given to the umbilical depression and other irregularities in the surface. When the patient is on the operating table and under the anesthetic, the bichloride compress is removed and the field again washed with alcohol or ether, applied by means of cotton balls, then with sterile water applied in the same way. The abdomen is then dried with sterile gauze and is ready for incision. If the vagina also is to be invaded during the operation, it must be prepared as described later under vaginal section.

There are many minor variations from the above used in different hospitals, to some of which variations much importance is attached by those using them. I have been on the lookout for improvements, but so far have encountered nothing that, on critical analysis, surpasses this standard method in simplicity and effectiveness. In hurry cases, where the abdomen must be opened at the earliest possible moment, the preliminary softening and loosening of the epidermal scales by the soap poultice must be dispensed with, and consequently extra care must be exercised in the other steps of the preparation. Here Harrington's solution (corrosiv. sublimate, 0.8 gm.; water, 300 c.c.; hydrochloric acid, 60 c.c.; alcohol, 640 c.c.) is preferable to the plain bichloride solution. It is a much stronger disinfectant, but more irritating. The various "rapid" methods of abdominal disinfection should, it seems to me, be confined to emergency cases, in which there is not time for the regular and more reliable process of skin cleansing.

B. Preparation of Instruments and Dressings. There are several ways of preparing instruments, sutures, dressings, etc.

The usual method is as follows:

1. Instruments are boiled ten to fifteen minutes. They must be entirely immersed in the water and the water must boil (not simply simmer) for at least ten minutes. A 1% solution of sodium carbonate (washing soda) is preferable to plain water, as it tends to prevent rusting of instruments. There are a few exceptions to the boiling rule. The knives and scissors are usually soaked in 95% carbolic acid for ten minutes or in 10% carbolic solution for half an hour, as boiling tends to dull them. However, if in a hurry, they may be boiled with the other instruments, in which case the cutting edge should be wrapped in cotton.

2. Gauze sponges and pads and dressings are sterilized in the steam sterilizer. The gowns for operator and assistants, and the sterile cloths and sheets, and instrument-trays and basins are put through the same process.

In emergency work in the country, where no steam sterilizer is available, an ordinary wash boiler may be used. The various articles to be sterilized (gauze, sponges, towels, sheets, gowns, etc.) are wrapped in small packages, each package being wrapped in two thicknesses of cloth, and are then boiled for thirty minutes. In order to dry the gowns somewhat, they may be removed from the boiler, wrung as dry as possible with clean hands, being careful to not disturb the double covering, and then dried in an oven.

In regard to the form of sponges used, I would strongly recommend the gauze-strip sponges for abdominal work (page 925). The numerous detached sponges ordinarily used are dangerous and have led to many deplorable accidents.

3. As to suture and ligature materials, silk and silkworm gut are boiled along with the instruments. Reliable catgut may be purchased, sterilized and ready for use.

4. The rubber gloves are wrapped in a towel and boiled along with the instruments. After boiling they are placed in 1-5000 bichloride solution.

They are much easier put on when partly filled with solution. The weak bichloride solution is used, so as to kill any bacteria that may work to the surface of the skin of the hands during the course of the operation. When the gloves are put on in simply sterile water, the warm mixture of sterile water and macerated epithelium, which forms in the glove during the course of a long operation, becomes a culture-medium for the bacteria which work to the surface from the deeper layers of the skin, and which may be liberated in the peritoneal cavity by a puncture of the glove.

C. Preparation of Operator and Assistants. Everything that is to come in contact with the operative field must be sterilized. The hands and forearms of the operator and assistants must be disinfected as far as possible, and should then be covered, so that there is no chance of direct contact of the operative field with the skin of the hands or arms, for the skin can not be absolutely sterilized. Again, the operator and assistants must be so covered as to effectually protect the field of operation from contamination by the clothing or by particles from the hair or beard, or by particles carried in the breath.

The accomplishment of this thorough protection of the operative wound has been the object of many decades of study and experimentation. The present effective technique for the preparation of the operator, as well as all the other antiseptic and aseptic preparations, was attained gradually by improvements added year by year, but it is all the direct outgrowth of the epoch-making work of Pasteur and of Lister. The following are the steps in the preparation of the operator and assistants:

1. The sleeves are rolled well up above the elbows and the finger-nails are trimmed short and cleaned thoroughly.

2. The hands and forearms are then scrubbed carefully and vigorously, for from three to five minutes, with warm water and some liquid preparation of green soap—using a stiff brush and giving particular attention to the irregularities about the nails and knuckles and to the spaces between the fingers at their junction with the hand. Where the brush causes undue irritation of the skin, gauze is preferable for scrubbing the arms, but not the hands.

3. Then the soap is washed off with sterile water, and the hands and forearms are scrubbed in 80 per cent. alcohol with gauze.

4. Then they are scrubbed in bichloride solution (1 to 2000), with a brush or gauze.

5. The sterile gown is then put on, the hair and mouth, and neck and greater part of the face are covered with gauze by the nurse, the rubber gloves and sterile muslin sleeves are adjusted and the operator is ready to begin. The gauntlet of the rubber glove is brought up over the lower end of the sterile sleeve to hold it in place, and the arm is thus securely covered and there is no chance for any skin surface to come in contact with the wound.

The assistants must go through the same process.

The process of hand disinfection given above is known as the "alcohol-bichloride" method. It is also called, from its originator, the **Fürbringer** method.

There are three **methods of hand-disinfection** which are much used. The thorough scrubbing with green soap and warm water is common to all of them. The further steps differ as follows:

a. The "alcohol-bichloride" method. The various steps in this method are given in detail above.

b. The "permanganate and oxalic acid" method. The hands and forearms are next immersed in a hot saturated solution of potassium permanganate and kept there until the skin takes on a dark brown color, then they are immersed in a hot saturated solution of oxalic acid until the skin again has its natural color. The oxalic acid is washed off in sterile water or sterile lime water, and the hands and forearms are then washed in bichloride solution (1-2000).

c. The "chlorinated lime and sodium carbonate" method. After the preliminary scrubbing a tablespoonful of chlorinated lime is taken in the palm of the hand, moistened with enough water to make a thick paste, and then a piece of sodium carbonate (washing soda) about the size of the thumb is crushed in the hand and rubbed thoroughly into the lime paste. This mixture, containing nascent chlorine, is then rubbed vigorously into the skin of the hands and forearms for three to five minutes. The parts are then washed in sterile water, and later in weak ammonia water to remove the chlorine odor.

As to the choice of method of hand-disinfection, that is largely a matter of personal preference. Any one of the above three methods, properly carried out, will give good practical hand-disinfection—i. e., from hands and arms so prepared, infection will rarely if ever take place. The important thing is not which method is chosen, but **how thoroughly** the chosen method is carried out. I have used all three methods, and very decidedly prefer the "alcohol-bichloride" method, though I have nothing serious to say against the others.

Absolute disinfection of the hands and arms is impossible by any method, as the disinfection is necessarily confined to the superficial layers of the epidermis. Bacteria situated in the deeper layers of the epidermis may work to the surface during the course of the operation; hence the importance of thoroughly covering the prepared hands and arms with rubber gloves and sterile sleeves.

REGULAR STEPS

In Abdominal Section.

In order to present some idea of the main features of this important therapeutic measure, I shall run hastily over the regular steps in this operation, and later consider briefly some of the special points that require attention.

The regular steps incident to every case of abdominal section are as follows:

1. Anesthesia.
2. Incision.
3. Exploration.
4. Correction of pathological condition.
5. Toilet of peritoneum.
6. Closure of incision.
7. Dressing.

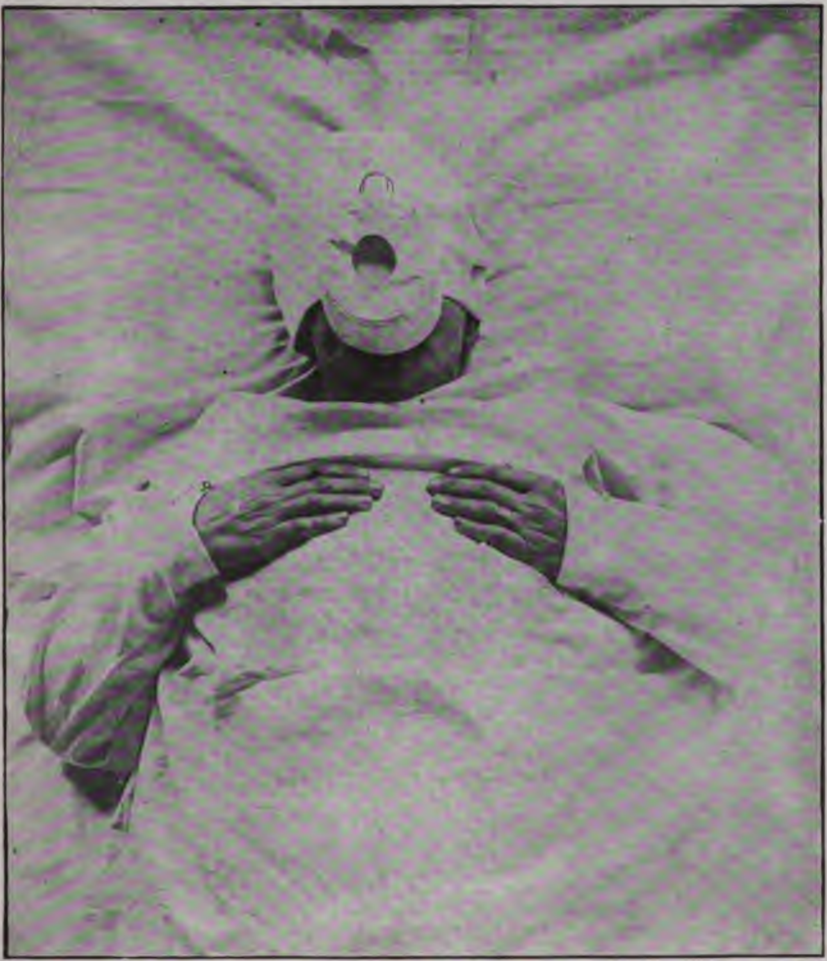

Fig. 713. The Safe Position of the Arms during Anesthesia. The elbows are brought to the patient's sides and the forearms rest comfortably against the chest, where they are held by the sleeves being pinned to the gown

1. Anesthesia. Ether is safer than chloroform, and is to be preferred in all cases except where there is some definite contra-indication.

There is neither space nor occasion here for a general consideration of anesthesia. There is one point, however, that I think advisable to call attention to, and that is the position of the patient's arms during anesthesia. Many cases of paralysis of one or both arms following anesthesia have been reported—the paralysis lasting for many months and sometimes for a year. is due largely to faulty position of the arms during anesthesia. This is

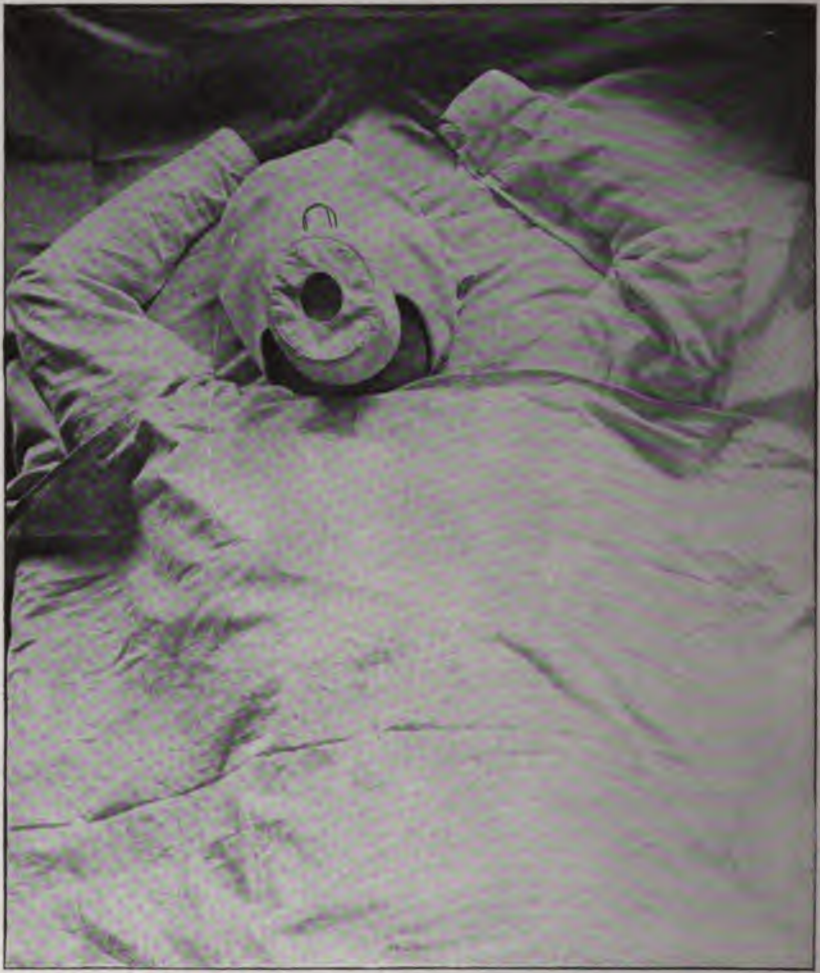

Fig. 714. A Dangerous Position of the Arms during Anesthesia. Many cases of paralysis of one or both arms from this position have been reported.

serious matter and attention should be called to it in every work dealing with anesthesia—and yet it is seldom mentioned. In 1905 I reported two cases of such brachial paralysis in detail to the St. Louis Medical Society, called attention to previous work and investigations on the subject, and demonstrated, directly on the cadaver, the compression of the brachial plexus by the clavicle when the arm is above the head.* As stated in the article, this has long been recognized as the cause of the paralysis, the attention of the profession generally having been first called to the subject by Budinger in 1894. Fig. 713 shows the safe position for the arms during anesthesia. No case of paralysis has ever occurred, as far as known, when the elbows were kept to the side as here indicated. Fig. 714 shows a dangerous position of the arms—the position the arms occupied in my two cases and in most of the reported cases of paralysis affecting the brachial plexus. Figs. 715 and 716 serve to call attention to the anatomical features of the trouble. Fig. 717 shows another dangerous position of the arm during anesthesia—this position being liable to lead to peripheral paralysis from pressure by the edge of the table.

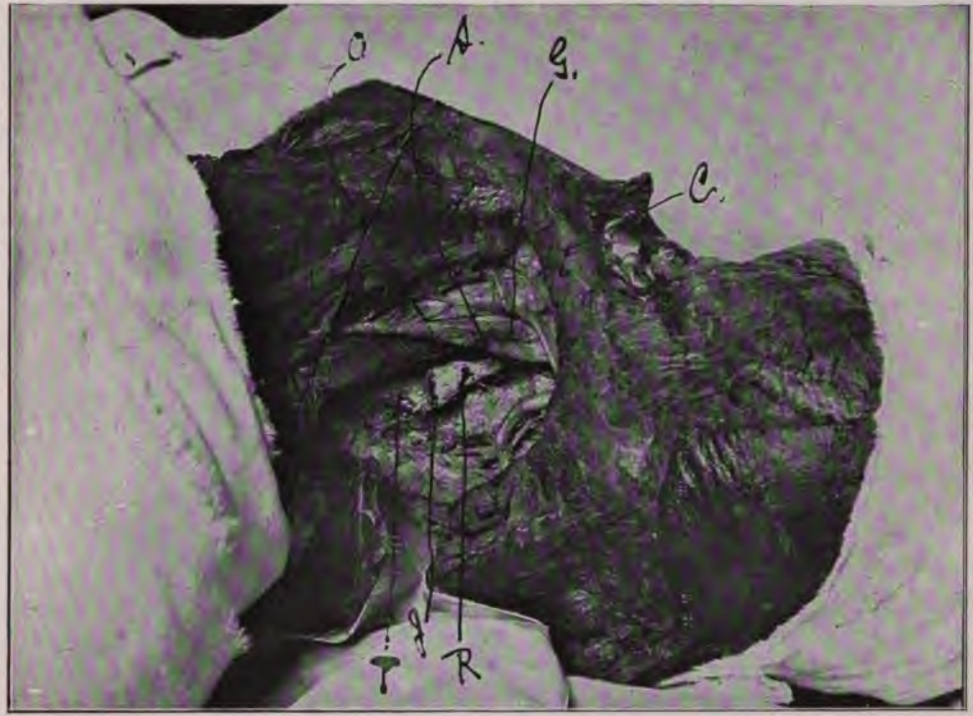

Fig. 715. View of the Dissected Area in a Cadaver, in which the arm was brought above the head as shown in Fig. 714. C, clavicle. R, first rib. T, transverse process of first dorsal vertebra. O, outer trunk of brachial plexus. S, stump of suprascapular nerve. G, compression groove made by clavicle when arm was above the head. (Crossen—*Journal of Missouri State Medical Association.*)

2. Incision. In abdominal section for pelvic disease the incision is made, almost invariably, in the median line. All parts of the pelvis may be reached from such an incision and, in practically every case, exploration of the whole pelvis should be made. Ordinarily the incision is begun about midway from the umbilicus to the symphysis and continued downward three or four inches. If there is no large solid tumor, the incision is made small at first, but large enough to admit the fingers or hand into the pelvis for exploration. As a rule the primary incision is about four inches long. If the abdominal walls are very thin, it may be shorter; if they are very thick, it must be longer.

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* Brachial Paralysis Following Surgical Anesthesia; Report of Two Cases By H. S. Crossen, M. D.—Journal of Missouri State Medical Assocation, vol. I, No. 10, 1905.

The lower the incision is placed, the more easily the deeper portions of the pelvic cavity may be reached, but the incision must not be low enough to injure the bladder. When a tumor is present, the bladder may be drawn up considerably; consequently in such a case the incision must not be extended low until the peritoneal cavity has been opened and the bladder located. If it is thought that the bladder may be drawn so high as to interfere with the ordinary incision, a steel bougie may be introduced into the bladder and the height of its cavity determined before the incision is made.

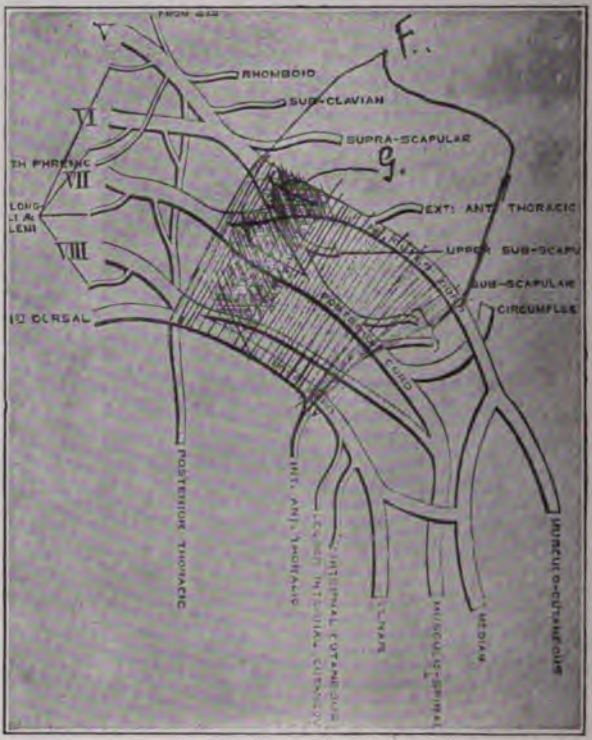

Fig. 716. Diagram of Left Brachial Plexus from Gray's Anatomy. F, Probable field within which would occur the lesion producing the symptoms mentioned in the reported cases. G, Location of compression groove in this cadaver. (Crossen—*Journal of Missouri State Medical Association.*)

In cutting through the abdominal wall it is not necessary to strike the tendinous tissue between the recti muscles. If the incision is made a little to one side of the tendinous center and passes through the rectus muscle of that side, it makes little difference. Consequently, no time should be lost trying to make a careful dissection exactly in the median line.

The incision is continued through the skin and the subcutaneous fat and fascia, and the rectus muscle with its tendinous sheath, down to the loose subperitoneal fat. When the subperitoneal tissue is reached, all bleeding it stopped, and the subperitoneal fat and connective tissue are cut through between two dissecting forceps. The peritoneum is then picked up with the dissecting forceps and a short cut is made in it, and this opening in the peritoneal cavity is enlarged by scissors or knife.

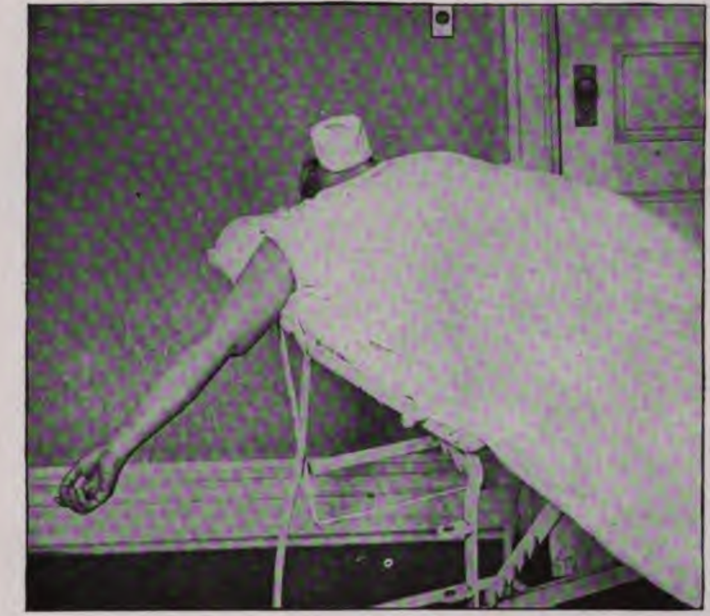

Fig. 717. Another Dangerous Position of the Arm during Anesthesia.

3. Exploration. When the proper opening has been made, the hand is introduced into the peritoneal cavity and the various pelvic organs are outlined and the pathological condition determined as accurately as possible.

4. Correction of Pathological Condition. After the exploration of the pelvic cavity and the determination of the exact condition present, the particular measures to be employed will depend on the nature of the trouble—the various affections requiring very different methods of treatment.

5. Toilet of the Peritoneum. All blood and clots are sponged out of the pelvis and, as far as practicable, the pedicle ends are turned under and all raw surfaces covered with peritoneum. All abdominal pads are then removed, the intestines are permitted to come back into the pelvis (the patient having been lowered from the Trendelenburg posture) and the omentum is spread out in its proper place.

6. Closure of Incision. There are two methods of closing the incision—(a) by "through and through sutures" of silkworm-gut and (b) by "tier sutures" of cat-gut or other absorbable material. Except in hurry cases, where it is exceptionally important to get the abdomen closed as quickly as possible, the preferable method is the latter—approximation by tier sutures of cat-gut, with or without two or three tension sutures of silkworm-gut.

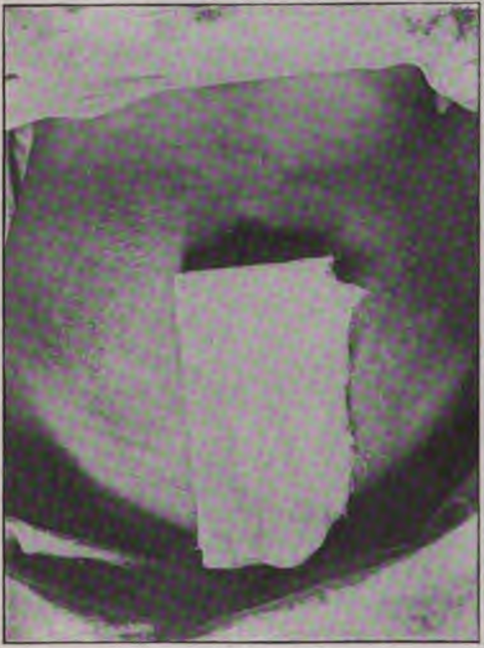

Fig. 718. The Abdominal Dressing. The Flat Gauze next to the wound.

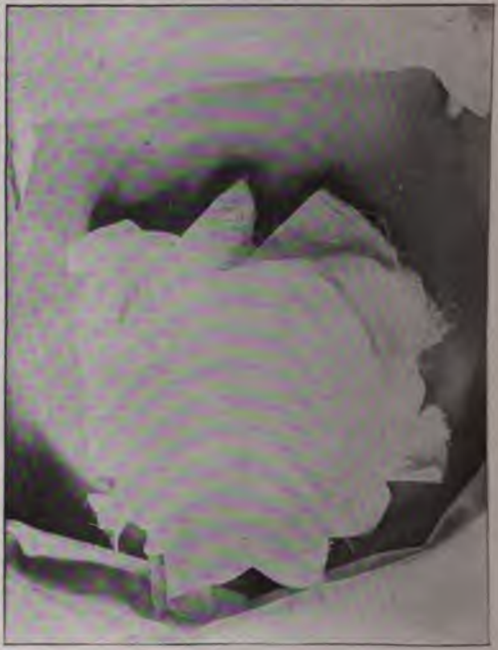

Fig. 719. The Abdominal Dressing. The Rough Gauze.

7. Dressing. The dressing of the abdominal wound consists of a large thick dressing of sterile gauze over the wound (Figs. 718, 719), next to that a layer of sterile absorbent cotton (Fig. 720) covering the anterior surface of the abdomen, and over that a medium-thick layer of sterile common cotton to turn any water that might be spilled on the dressing during convalescence and to give even elastic pressure at all points—the whole held in place by a binder about the abdomen, with perineal straps to hold it well down (Fig. 721).

SPECIAL POINTS

In Abdominal Section.

There are a number of special items that must receive careful consideration by every one doing abdominal section work. Among these may be mentioned the following:

1. Drainage.
2. Shock.
3. Injury to adjacent organs.
4. Foreign bodies in abdomen.

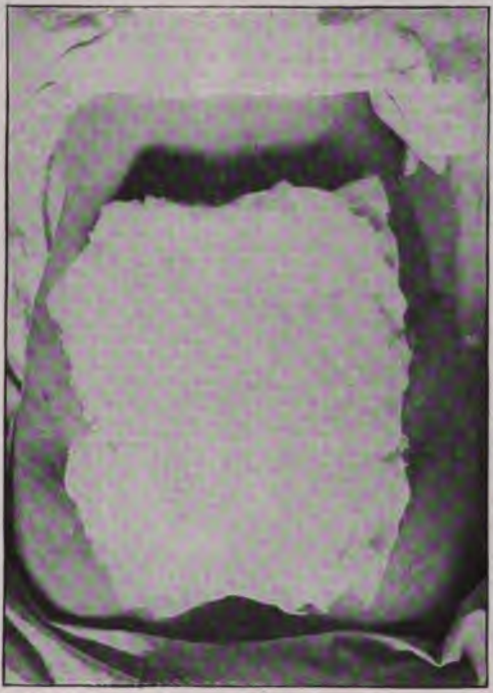

Fig. 720. The Abdominal Dressing. The layer of Absorbent Cotton.

1. Drainage. The rule in abdominal surgery is never to drain unless there is some special reason for it, and that special reason must be a very strong one. Experience has abundantly shown that in all but exceptional cases the best results are obtained by closing the peritoneal cavity completely and leaving nature to carry on the reparative process alone, undisturbed by tubes or gauze or other form of drainage.

That small percentage of cases in which drainage is advisable includes the following classes:

a. Rapidly spreading inflammation of the peritoneum or acute general peritonitis. In such cases free drainage is indicated, and as a rule the freer the better.

b. Rupture of abscess in pelvis. This accident happens not infrequently during the enucleation of an inflammatory mass containing pus. In som cases the pus is not confined in any removable sac, but has burrowed i

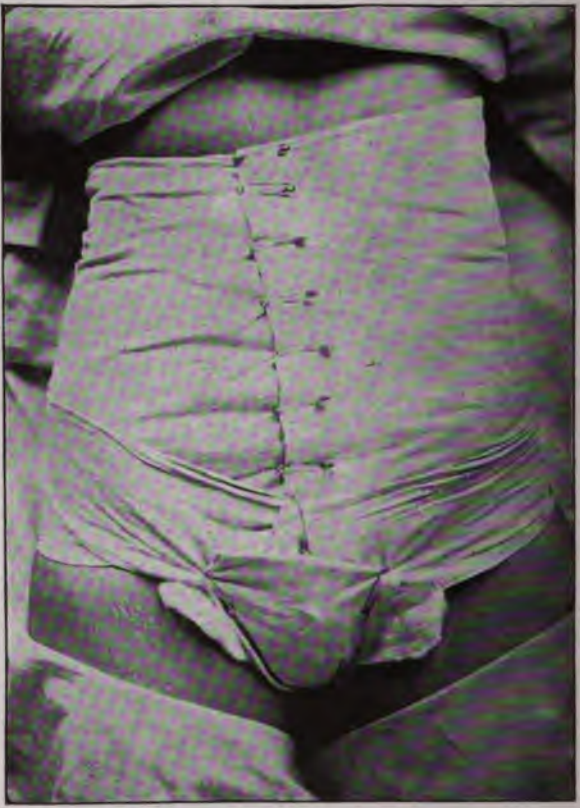

Fig. 721. The Abdominal Dressing. The Binder applied.

various directions among the adherent organs. In such a case as soon as th adhesions are separated the pus flows out into the peritoneal cavity.

c. Persistent free oozing from surfaces left after the enucleation of an inflammatory mass. Here the effect desired is pressure rather than drainage but, as the end of the gauze used for pressure must be brought out throug the abdominal wound or through the vagina, it is usually referred to as drain or pack.

2. **Shock.** The principal factors in shock are (a) loss of blood, (b) exposure and handling of abdominal contents and (c) long anesthesia. T

avoid shock, therefore, particular attention must be given to the following points:

a. Careful hemostasis. All vessels that can be located are ligated or clamped before they are divided. In cutting through ligated tissues, forceps are in readiness to catch any vessel that may have escaped the ligature or upon which the ligature is not tight enough.

b. Protection of the abdominal contents, as far as possible, from handling and exposure. The Trendelenburg posture accomplishes this to a large extent. In this posture the intestines and omentum gravitate into the upper part of the abdominal cavity, away from the field of operation. Those parts that still tend to protrude into the pelvis are held out of the way by gauze, which, at the same time, serves to wall off the pelvis from the abdominal cavity. When the intestines are unavoidably permitted outside of the peritoneal cavity, they should be kept covered with large sterile towels soaked in hot saline solution.

c. Minimum duration of anesthesia. To cut down the duration of the operation and consequently of the anesthesia, the operator should work rapidly—as rapidly as is consistent with safety and accuracy—but accuracy must not be sacrificed to haste.

3. Injury to Adjacent Organs. The ureter, the bladder and the intestines are the organs particularly liable to injury in difficult cases. Ordinarily an injury of any of these organs occurring in the course of an operation must be repaired at once or at the close of the operation, and any one doing pelvic surgery must be prepared to immediately take care of the injuries mentioned.

4. Foreign Bodies Left in the Abdomen. The absolute certainty of the removal of all articles carried into the peritoneal cavity is a subject that deserves most careful consideration. It is surprising how easily and quickly the intestinal coils will enfold an object and carry it out of sight and touch.

Sponges. A sponge left in the peritoneal cavity following an operation constitutes one of the most deplorable accidents of abdominal surgery. This is not a new subject. Much has been written upon it and many cases have been reported, and many suggestions have been made as to preventive measures. But all such measures hitherto proposed have broken down under the various circumstances and vicissitudes of surgical work, as evidenced by the records subsequently cited. In connection with this subject I wish to call attention to the following facts:

1. Sponges are lost in the peritoneal cavity much more frequently than is generally supposed. The accompanying table of reported cases (page 934) will indicate the importance of the subject. And it must be kept in mind that the reported cases represent only a small proportion of the recognized cases, for, naturally, the accident is not given publicity except where there in some special reason for doing so. In any large body of surgeons a little experience meeting, in which testimonies are freely given, will bring to light a number of unreported cases of this accident.

Furthermore, many cases are not even recognized. The patient dies with evidence of peritonitis; there is no suspicion of any foreign body having been left in the abdomen, no post-mortem examination is made and the death is supposed to be due to ordinary peritonitis. The possibilities in this direction are indicated by the fact that in the series mentioned, in thirty-nine of the cases the accident was recognized only on post-mortem examination, when the sponge was found, but would have remained unknown had there been no autopsy.

2. It is a most serious accident. In the large series of cases collected more than one-fourth of the patients died, and of those who recovered many went through weeks and months of suffering.

3. To persons outside the profession the accident seems absolutely inexcusable. They can understand how other complications may arise, such as hemorrhage or sepsis or kidney failure, in spite of every precaution, but they can imagine no reasonable excuse for allowing a sponge to be lost in the patient's interior. To those not familiar with surgical work it seems past belief that the surgeon would carry into the peritoneal cavity anything the removal of which was not provided for with absolute certainty.

The growing cognizance of the public in regard to the occurrence of this accident and the feeling in regard to the responsibility for it are reflected in the increasing number of lawsuits connected therewith (see Chapter XVII).

4. There has hitherto been no sure preventive method which was applicable in all the circumstances of abdominal surgery. The list of preventive measures recorded later shows that much thought has been given to devising means for preventing this accident. Rules interminable have been proposed, and expensive and cumbersome racks and stands devised for the purpose. Not one of these devices, however, has proven absolutely safe, for the reason that in their use the certain removal of all sponges carried into the abdomen depends on the studied attention of the operator or on a system of attentive co-operation among assistants or nurses. While such attentive co-operation is entirely feasible under ideal conditions and with ideal persons, the fact remains that it is not secured and is not likely to be secured under the variable circumstances of abdominal work. The many emergencies which arise in the course of abdominal operations, the changing assistants and nurses, the hurried operations at night in the hospital with short help, the operations in private homes where the patient cannot be gotten to the hospital at all—all these conditions play havoc with safety arrangements depending upon a nicely-balanced system of rules and co-operation or on the use of cumbersome racks or stands.

There is not space here to take up in detail the various ways in which mistakes have occurred; suffice it to say that a review of the cases where dependence was placed on counting shows an appalling list in which a sponge was left, because one was hastily torn in two and one-half forgotten, or an extra one was primarily included in the bundle and missed in the counting, or an extra one was secured for an emergency during the operation, or some loose piece of gauze, not intended for intraperitoneal use, slipped in while near the wound, or a mistake was made in the final count of the sponges removed. It is astonishing what a slight inattention may lead to a sponge being left, and the consequent death of the patient.

The method of attaching a tape to each sponge and then fastening a forceps to the tape and at the same time to the abdominal sheet, is the method probably in most general use. It has a record of many accidents—the tape pulled off the sponge, or there was a failure to attach the forceps, or the forceps failed to hold well. In one case recorded the sponge, tape and forceps were all lost in the cavity.

The difficulty of guarding absolutely against leaving a sponge in the abdomen is such that entire security against this fatal accident is counted one of the unsolved problems of abdominal work. Practically all writers on the subject state that there is no guaranty against its occurrence, even in routine hospital work and with all the rules of co-operation and the special apparatus designed to prevent it. Neugebauer, in a most exhaustive consideration of the subject, comes to the conclusion that the accident is, to a certain extent, unavoidable. Schachner, in an excellent paper, states, "So long as surgery continues an art, just so long will foreign bodies continue to be unintentionally left in the abdominal cavity." In an article published recently, Findley states, "In former years the abdominal surgeon was seriously disturbed by well-grounded fears of secondary hemorrhage and sepsis, but surgery has mastered these problems to a large degree and they are little feared and seldom experienced. Now it is the thoughts of the sponge that disturb the night's repose when the report comes that something has gone wrong with our patient. The operator never can rid himself of the feeling of uncertainty as to the possibility of leaving a sponge." This expresses very well the feeling of those who have given attention to this subject, and particularly of those who have personally experienced the accident and have thus been brought face to face with a concrete exemplification of the inadequacy of the usual methods.

The continued occurrence of this fatal accident and the failure of the preventive methods in general use constitute sufficient reason for my calling attention to a method which I have used with much satisfaction for the past four years. This method gives entire security and at the same time is simple and inexpensive, and is effective in all conditions of abdominal work—in the emergency operation in the country with unfamiliar assistants, as well as in the routine hospital work. The failure of the safety methods in general use is due to their dependence upon sustained attention concerning the sponges, which attention on the part of the surgeon cannot be given to the sponges, for it is required elsewhere. A method, to be effective under all circumstances, must be practically automatic, insuring the removal of all gauze without particular attention on the part of any one at the time of the operation.

The Method.

The underlying principle of this method is the elimination of all detached pads and sponges. In place of them I use long strips of gauze, each strip packed into a small bag in such a way that it may be drawn out a little at a time as needed.

I was led to a study of the subject and the adoption of this method by an unfortunate experience. Following the usual technique, I operated for years without accident, but five years ago I left a gauze pad in the abdomen. The case was one of diffuse pelvic suppuration, requiring extensive drainage, and, fortunately, the pad was discovered and extracted through the drainage opening about two weeks later. The patient recovered without serious result from the accident—but the lesson was not lost. I determined to find some method that would really prevent such an accident—a method which would be entirely under the control of the operator and first assistant (a greater division of responsibility increases the danger) and one which would occasion no delay in the closing steps of the operation. There had to be taken into consideration the large pads for holding the intestines out of the way and the small pads and gauze pieces for sponging. In place of several large pads for packing back the intestines, I adopted the large roll of gauze, then in use by a number of operators, and found it satisfactory.

The matter of the small pads and sponges, however, was not so easily disposed of. I felt that it was imperative to find some method that would do away entirely with dependence on the counting of the sponges at the close of the operation. As long as there was dependence on counting of the numerous small pads and sponges there would be mistakes, and consequently sponges would occasionally be left in the cavity. To eliminate this hazardous dependence on counting, and to provide a method that would make the leaving of a sponge in the abdomen practically impossible, was not an easy task. I worked over the problem for the greater part of a year. I tried various methods in common use for keeping track of the small pads and sponges, such as clamping an artery forceps to a tape attached to each sponge, attaching a heavy ring to each tape before sterilization, clamping each tape or a corner of each sponge to the sterile sheet about the wound, and the like. But I did not find any such method that was practical under all circumstances and absolutely safe.

It then became evident to me that if safety were to be secured, the detached pads and sponges must be eliminated entirely. In pursuance of that idea I devised the method here described. The principle of this method is that no detached piece of gauze shall enter the abdominal cavity. Each piece of gauze introduced for sponging is simply part of a very long piece, the greater part of which is always outside the cavity. To make assurance doubly sure, I have recently put the large roll of gauze above mentioned into a bag, similar to the bags for the narrow strips, except that it is open on the side. As now used, therefore, the set consists of the following:

Gauze-Strip Sponges for Abdominal Section.

Four narrow strips—10 yds. long, 3 in. wide—6 thicknesses.
One wide strip—5 yds. long, 9 in. wide—4 thicknesses.
Have another set of strips (4 narrow and 1 wide) in reserve.

For the Narrow Strips the yard-width of gauze is divided into two strips, and each of these, when folded to six thicknesses, is about three inches wide. For the Wide Strip the full yard-width of gauze is used—when folded to four thicknesses it is nine inches wide. Turn in all raw edges so that no raveling can be left in the abdominal cavity.

Pack each Narrow Strip into a separate small cloth bag, 5 in. wide and 10 in. deep, (Fig. 722, a) and attach a large safety pin to the bottom of the bag. The safety pin is to pin the bottom of the bag to the abdominal sheet at operation. Make the bag of extra heavy muslin or drilling, and sew with French seams to avoid raveling on the inside. The end of the strip first introduced to bottom of the bag should be fastened there securely by stitching through and through. Then pack the strip firmly into the bag (Fig. 723) in such a way that it will come out easily, a little at a time as needed (Fig. 726). Four of these filled bags belong in each set (Fig. 725, a).

For holding the Wide Strip use a bag 6 in. by 10 in., and open on the side instead of at the end (Fig. 722, b). Fold the strip back and forth, thus forming a narrow pile about three inches wide (see Fig. 724). Fasten one end of the strip securely to the bottom of the bag by sewing through and through. Then place the folded strip in the bag in such a way that, when pulled upon, it will come out, a little at a time, as a wide strip suitable for packing back the intestines. Fold over the open side of bag and pin with two large safety pins (Fig. 725, b). The safety pins are for fastening two corners of the bag to the abdominal sheet (Fig. 727).

One wide strip and four narrow strips constitute one set and are to be wrapped together in a cloth for sterilization in the usual way. Have also an extra sterilized set in reserve. At the operation the bag containing the wide strip is to be placed in hot normal saline solution. The narrow strips are to be used dry.

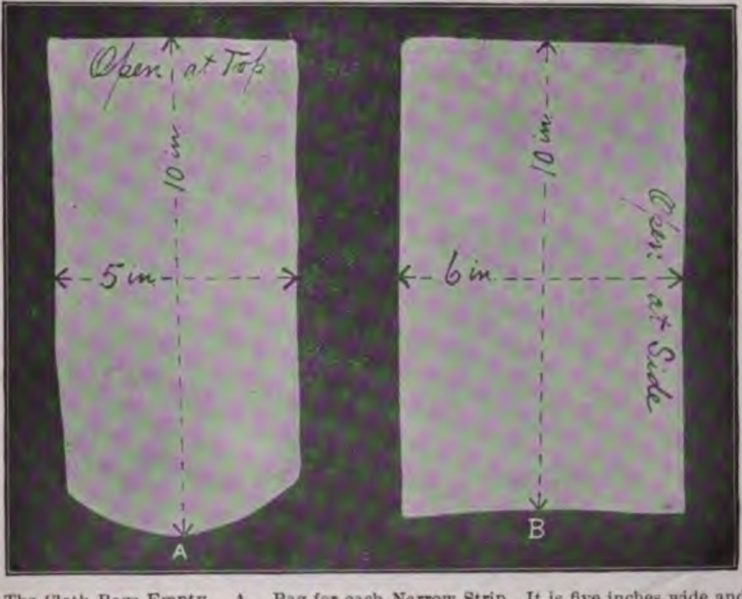

Fig 722. The Cloth Bags Empty. A. Bag for each Narrow Strip. It is five inches wide and ten inches deep, and is open at the top. It is made of extra heavy muslin and is sewed with French seams, so that there is no chance for any raveling to be pulled out with the gauze. B. Bag for the Wide Strip. It is six inches by ten inches, and is open at the side. This bag is the same as those for the narrow strips except that it is one inch wider and is open at the side instead of at the end.

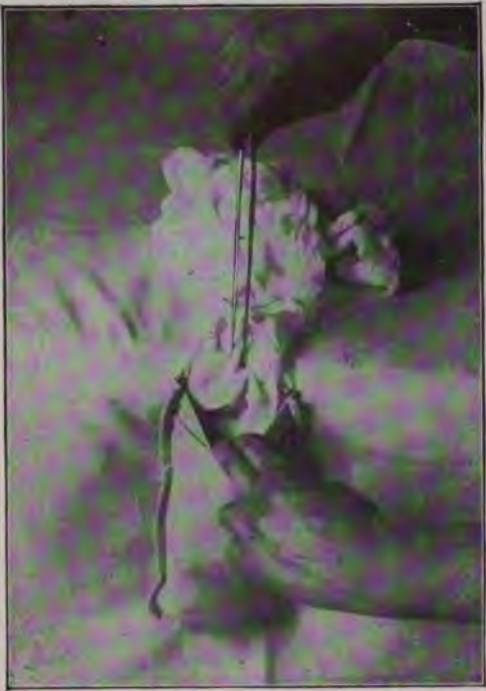

Fig. 723. Packing the Narrow Strip into the bag. The end of the strip is caught with a forceps and carried to the bottom of the bag, where it is fastened securely by sewing through and through, and then successive portions are rapidly packed in with the forceps. When packed in thus, the gauze strip may be drawn out a little at a time as needed.

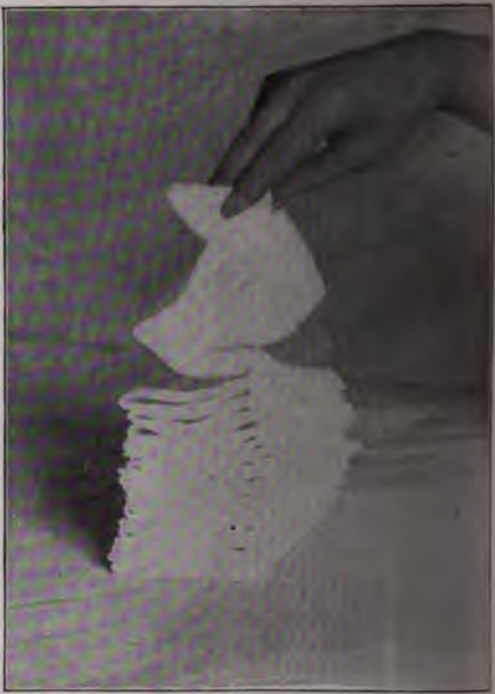

Fig. 724. The Wide Strip folded and ready to put in the bag. One end of the strip is first introduced to the bottom of the bag and fastened there securely by sewing through and through. Then the whole strip, folded as shown, is placed in the bag. When the strip is folded in this way it will, when pulled upon, come out as a wide strip, suitable for packing back the intestines (see Fig. 727.)

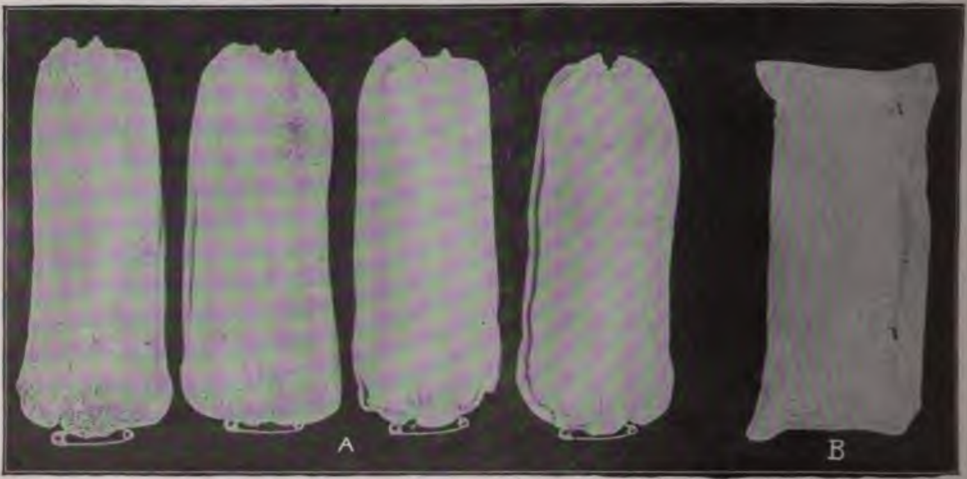

Fig. 725. A Set of Gauze-Strip Sponges. A. Four Narrow Strips. The safety-pin at the bottom of each bag is for fastening the bag to the abdominal sheet (see Fig. 727). B. Wide Strip. The two safety-pins closing the bag are used later for fastening the corners of the bag to the abdominal sheet (see Fig. 727.)

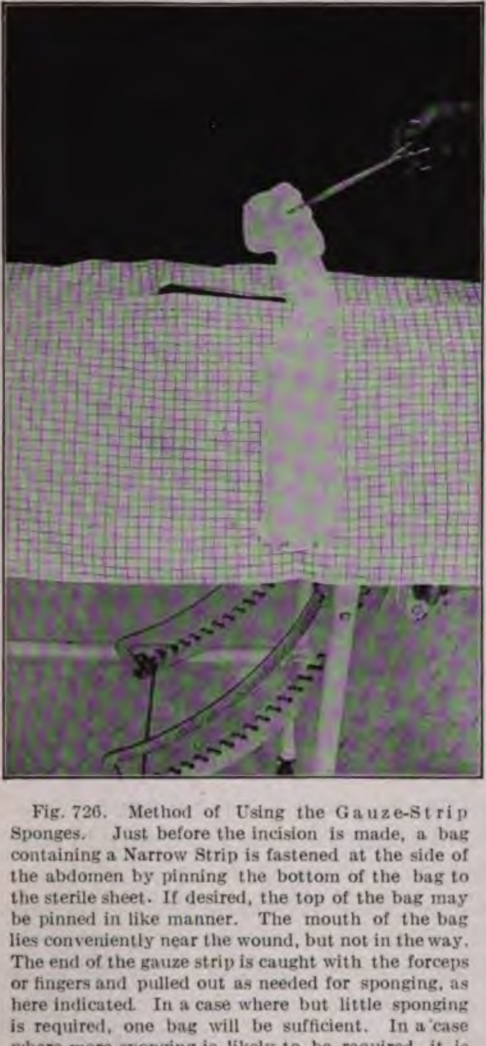

Fig. 726. Method of Using the Gauze-Strip Sponges. Just before the incision is made, a bag containing a Narrow Strip is fastened at the side of the abdomen by pinning the bottom of the bag to the sterile sheet. If desired, the top of the bag may be pinned in like manner. The mouth of the bag lies conveniently near the wound, but not in the way. The end of the gauze strip is caught with the forceps or fingers and pulled out as needed for sponging, as here indicated. In a case where but little sponging is required, one bag will be sufficient. In a case where more sponging is likely to be required, it is well to fasten a bag on each side of the abdomen at the beginning of the operation. The bag on each side gives a sponge immediately at hand for both the operator and the first assistant. The convenience of this will be appreciated by those who have had to wait, in an emergency, for a sponge to be handed to them. [For photographing, the checked toweling was used instead of the usual white abdominal sheet, so as to show the white bag and strip better by contrast.]

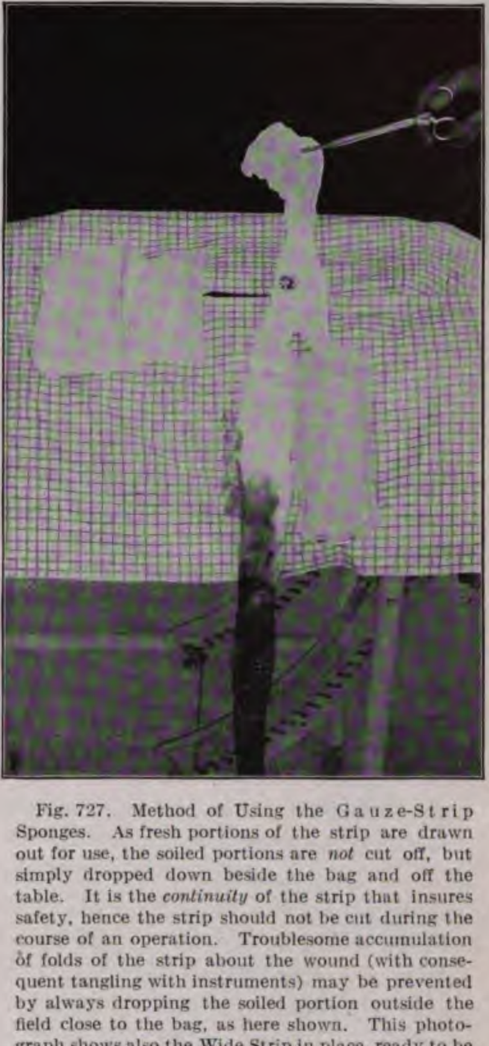

Fig. 727. Method of Using the Gauze-Strip Sponges. As fresh portions of the strip are drawn out for use, the soiled portions are *not* cut off, but simply dropped down beside the bag and off the table. It is the *continuity* of the strip that insures safety, hence the strip should not be cut during the course of an operation. Troublesome accumulation of folds of the strip about the wound (with consequent tangling with instruments) may be prevented by always dropping the soiled portion outside the field close to the bag, as here shown. This photograph shows also the Wide Strip in place, ready to be used for packing back the intestines or walling off a large area or any other purpose for which large pads are ordinarily used. The bag containing the wide strip is preferably wrung out of hot saline solution just before use. It is then laid on the abdomen, opened, two corners pinned to the abdominal sheet, as here shown, and the strip drawn out as required. No detached pads or other pieces of gauze are allowed about the operative field, hence none can be carried into the abdominal cavity to be left there.

This method eliminates all chance of leaving a piece of gauze in the abdomen, for a large part of the strip is always outside the cavity, and the end is fastened securely outside. An important point is that the sure removal of all gauze is practically **automatic.** It does not depend on the accuracy of a hurried counting of sponges at the close of the operation nor on catching each sponge or sponge-tape with a forceps as it is put into the cavity, nor on a studied "watching what sponges go in and what sponges come out of the cavity." Those methods that depend for safety on the observance of complicated rules or on the strict following of a regular routine, or on the constant attention of the operator, have all broken down under the difficulties and vicissitudes of abdominal surgery, as the reported cases clearly show. A method, to be safe and suitable for general use, must be practically automatic in the removal of all gauze carried into the cavity, must be comparatively inexpensive in materials and preparations, must be fairly simple and convenient in use, and must be applicable in every environment, including emergency work in the country. These requirements are met by the method here described.

The dangers from hemorrhage and sepsis in clean cases have been largely done away with through improvements in technique, and now this other serious menace in abdominal work should be eliminated. The patient has a right to demand, and is demanding as the many law suits show (see Chapter XVII), that real protection be afforded against leaving a sponge in the abdomen. It seems only justice to those who intrust themselves to our care that we should provide absolute security against this fatal accident, so far as such security is practically attainable.

It simplifies the preparations for abdominal section—all the many pads and sponges of various sizes being replaced by five strips of gauze. The gauze is simply folded and then tacked by a few stitches at each end to prevent unfolding. Nurses as a rule welcome the method, stating that it is much less troublesome than the sewing of the numerous small pads and sponges. The bags may be used again and again after sterilization.

Many questions have been asked me concerning this method by surgeons contemplating its use, but there is room here for only two.

"Do not the methods in general use give practical safety?"—The facts previously mentioned and the table of cases subsequently given answer that question to a large extent. Hitherto there has not been a method, practically applicable in all the vicissitudes of abdominal surgery, which would entirely prevent this accident. Practically all authorities state that it is to a certain extent unavoidable. Notwithstanding all the methods hitherto proposed, many lives are still being sacrificed to this accident. In spite of widespread interest in the subject in recent years and of much study and investigation of it and several excellent papers by different authorities, there has been no signal advance. Ten years ago operators were using the same preventive measures now commonly employed. The sponges were counted, tapes were attached to the sponges that were counted, forceps were attached to the tapes that were attached to the sponges that were counted, etc. Yet with all these complicated precautions, many sponges were left in the cavity, as the records show.

"Is not the strip of gauze extending from the forceps to the bag inconvenient and in the way when sponging?"—Sometimes it is in the way to a slight extent, but not as much as would at first appear. Any new method seems somewhat awkward at first, and this is no exception to the rule. However, in my experience so far, I have not found any situation in which there was serious interference with satisfactory sponging or with any other operative manipulation. Like any other important step in technic, it should be studied until it is clearly understood before an attempt is made to use it. There are two particular points that may be mentioned. To prevent the accumulation of loose folds of gauze in the vicinity of the wound, the used portion of the strip should always be dropped outside the field, close to the bag. Again, when taking hold of a fold, to sponge with, draw it out of the bag for some distance, so that it can be introduced into the abdomen as far as desired freely and without tension.

Forceps. In about one-fourth of the recorded cases of a foreign body left in the abdomen the article left was a forceps or piece of an instrument, or other small object used about the wound. This calls attention forcibly to the fact that small instruments should not be allowed about an open abdominal wound. Neugebauer long ago called attention to this danger of small instruments, and urged the use of long instruments exclusively in abdominal work.

Many surgeons have adopted this safety measure, but there are many others who seem to give no thought to the matter, and continue to use numerous small instruments in this dangerous locality. It may not be possible at present to entirely prevent the accident of leaving some article of the surgical armamentarium in the abdomen, but it is possible to reduce the danger to a minimum by the use of long instruments exclusively, and it seems to me that all those who are engaged in abdominal surgery should be led by common prudence to adopt this simple expedient. The details, as carried out in my own work, are as follows: Every instrument used about the wound is long—so long that a portion of it is practically always outside the abdominal cavity. Again, if by accident such an instrument should slip entirely into the cavity, its length is such that it would almost certainly be felt when the hand is carried into the cavity for the final palpation before closing. All the artery-forceps, dissecting-forceps, tenaculum-forceps, pedicle needles, scissors and other instruments for internal work are from six and a half to eight inches long, the shortest being the large dissecting scissors (six and one-half inches). The shortest instrument used anywhere about the wound is the scalpel (six inches), which is laid aside as soon as the peritoneal cavity is open. The needles and Murphy buttons are not brought near the wound, except when held with a forceps or with a suture attached. No Michel clamps (for holding rubber tissue or gauze along the wound margin) or other small unattached objects are allowed near the wound as long as the peritoneal cavity is open.

The following table will serve to call attention to the importance of the subject of foreign bodies left in the abdominal cavity at operation.

Abdominal Section. Sponges Left.

No.	Date of Report.	Operator*	Character of Operation.	Article Lost.	When and How Removed.	Result.
1	1859	Fehr	?	Sea sponge.	Details not given. Mentioned by Fehr and quoted by Olshausen.	?
2	1877	?	?	Sea sponge.	Found at secondary operation by G. Braun. *c.*	?
3	1883	Lawson Tait.	?	Sponge.	Sponge missed. Four hours later wound was reopened and sponge recovered. *a.*	?
4	1884	H. P. Wilson.	Ovarian cyst and pregnancy.	Pieces of sea sponge.	Five months after operation, pieces passed through sinus in scar. *a.*	Recovery
5	1884	T. G. Thomas.	Carcinoma of spleen.	Pieces of sea sponge.	Found at autopsy. Patient died four days after operation. Carcinoma inoperable. *a.*	Death.
6	1884	Howitz.	Uterine necrosis.	Sponge.	Found at autopsy. Details not given. Cited by Wilson. *a.*	Death.
7	1884	London surgeon.	?	Sponge.	Found at autopsy.† Cited by W. T. Howard and also by Wilson. *a.*	Death
8	1889	Bridden.	Myomectomy.	Sea sponge, 7 cm. wide.	Found at autopsy. Patient died sixth day of peritonitis. *c.*	Death.
9	1892	Pilate.	Hysterectomy.	Compress, 8 inches long.	Passed per rectum, nine months after operation. *a.*	Recovery
10	1892	Salin.	Ovarian tumor.	Gauze napkin.	One year later, gauze removed through an abscess sinus, with subsequent fecal fistula which healed. *a.*	Recovery
11	1892	French surgeon.	Salpingitis.	Two strips of gauze.	Eight months later, 35 cm. strip of gauze extracted per vaginam, still later intestine resected and 10 cm. strip found within. *a.*	Recovery
12	1892	French surgeon.	Uterine fibroid.	Compress, 26 cm. long.	Eight months later passed per rectum, without alarming symptoms at any time. *a.*	Recovery
13	1892	French surgeon.	Myomectomy.	Sponge.	A few hours after operation abdomen was reopened and sponge located and removed. *a.*	Recovery
14	1892	Quinn.	Pyosalpinx.	Napkin.	Found at autopsy. Was suspected. Death on third day with symptoms of severe dysentery. *a.*	Death.
15	1893	Terrier.	?	Sponge.	Found at autopsy. Death on third day from peritonitis. *a.*	Death.
16	1893	?	Hysterectomy.	Compress.	Secondary operation by Michaux for painful abdominal mass. Compress found within intestine.	Death.
17	1895	Elsner.	Fibroid and ovarian cyst.	Pad, 7x8 inches.	Six months later, passed per rectum. Progress of mass noted along course of colon in last month. *a.*	Recovery
18	1896	MacLaren	Ovarian cyst and retroversion.	Gauze sponge 6x6 inches.	Ten days after operation, expelled from rectum. Secondary operation three months later for adhesions. *a.*	Recovery
19	1896	?	?	Sea sponge.	Details not given. Two cases were observed by MacLaren at autopsy in New York Woman's Hospital.	Death.
20	1896	?	?	Sea sponge.	See preceding note.	Death.
21	1896	Severeano	Ovarian sarcoma.	Two compresses, each 130x30 cm.	After some months, one compress was extracted from a persistent sinus, and three weeks later, the other. *a.*	Recovery
22	1897	Tuholske.	?	Sponge.	One hour after operation, sponge missed. Abdomen reopened and sponge found and removed.	Recovery
23	1897	?	?	Sponge.	Details not given. H. C. Coe states that in autopsy work he found a sponge in five cases. Death by sepsis in each. *a.*	Death.
24	1897	?	?	Sponge.	See preceding note. *a.*	Death.
25	1897	?	?	Sponge.	See preceding note. *a.*	Death.
26	1897	?	?	Sponge.	See preceding note. *a.*	Death.
27	1897	?	?	Sponge.	See preceding note. *a.*	Death.
28	1897	?	?	Sponge.	Twelve years later, passed per rectum. Reported by Hefting. *a.*	Recovery
29	1897	Linquist.	Tubal pregnancy.	Gauze compress.	Two months later, passed per rectum. *a.*	?
30	1897	McMurtry.	Ovarian cyst.	Flat sponge.	Sponge missed before patient recovered from anesthetic. Sutures clipped and sponge removed.	Recovery
31	1897	R. B. Hall.	Appendicitis.	Sponge.	Four hours later, sponge missed. Abdomen reopened and sponge removed.	Recovery
32	1898	Wiggin.	Secondary operation for silk ligature.	Gauze strip.	Some weeks after operation, gauze strip was removed from a persistent sinus. Lawsuit. *c.*	Recovery

ABDOMINAL SECTION. SPONGES LEFT.

No.	Date of Report.	Operator*	Character of Operation.	Article Lost.	When and How Removed.	Result.
33	1898	Schramm.	Hysterectomy.	Compress.	Four weeks later, operated for a mass, which proved to be the compress. *a*.	Recovery
34	1898	Leopold.	?	Compress.	Removed by secondary operation. Was near liver. *a*.	Recovery
35	1898	?	Cesarean section.	Compress.	Found at autopsy by Olshausen. Caused fatal peritonitis. *a*.	Death.
36	1898	Brosin.	Bicornuate uterus.	Compress, 20 cm. long.	Six months later, expelled from a persistent sinus. *a*.	Recovery
37	1898	Roesger.	Uterine fibroid.	Fragments of sea sponge.	After six months, particles discharged through a persistent sinus. *a*.	Recovery
38	1898	Bolt.	Hysterectomy for fibroid.	Gauze sponge.	Several months later, secondary operation. Sponge found in intestine. Resection. Death from shock. *a*.	Death.
39	1898	Schroeder.	Oophorectomy.	Gauze sponge.	Secondary operation some months later for an abdominal mass. Sponge in mass. *a*.	?
40	1898	?	?	Sponge.	Found at autopsy by Thiersch. *a*.	Death.
41	1898	?	?	Sponge.	Boldt stated in 1898 that he knew of five unpublished cases (among colleagues) of foreign bodies left in abdomen. *a*.	?
42	1898	?	?	Sponge.	See preceding note of five cases (count three sponges, and two forceps). *a*.	?
43	1898	?	?	Sponge.	See preceding note. *a*.	?
44	1898	?	?	Sponge.	Boldt states that pathologist in New York Hospital found foreign body at autopsy in two cases (1 sponge, 1 forceps.) *a*.	Death.
45	1898	?	?	Sponge.	Boldt cites two cases in which abdomen was immediately opened, and forgotten article removed (1 sponge, 1 forceps.) *a*.	?
46	1898	Eckstein.	Ovarian cyst, twisted pedicle.	Sponge 20x40 cm.	Five weeks later extracted from sinus in scar. Count of sponges after operation, stated "correct." *d*.	Recovery
47	1899	Buschbeck.	Tubal pregnancy.	Large compress.	Two and one-half years later removed from sinus in scar. *a*.	Recovery
48	1899	Meinert.	?	Mull compress.	Three weeks later, secondary operation for mass in right lower abdomen. Proved to be compress. *a*.	Recovery
49	1899	Rehn.	Pyosalpinx.	Compress, 1 m. square.	Four months later secondary operation. Compress found within intestine. Resection of 40 cm. *a*.	Recovery
50	1899	Kader.	Salpingitis.	Compress, size of handkerchief.	Sinus present for six months. Later the compress passed per rectum. Death from peritonitis. *c*.	Death.
51	1899	Busch.	Uterine fibroid.	Mull compress.	Two months later, passed per rectum, after much trouble. *a*.	Recovery
52	1899	Fritsch.	?	Sponge.	One year later removed by secondary operation. Cited by Kayser. *c*.	Recovery
53	1899	Fritsch.	?	Sponge.	No details given. Cited by Kayser. *c*.	?
54	1899	Fritsch.	?	Sponge.	Two years later removed by secondary operation. Cited by Kayser. *c*.	Recovery
55	1899	Gillette.	Tubal pregnancy.	Sponge.	Eighteen months later, removed by secondary operation. Lawsuit.	Recovery
56	1900	Merttens.	Pelvic suppuration.	Compress.	Five months later, operation for abdominal mass. Compress within intestine. Resection of intestine. *a*.	Recovery
57	1900	Wunderlich.	Ovarian cyst.	Compress, 21x100 cm.	Three months later, compress was passed per rectum. *c*.	Recovery
58	1900	Wunderlich.	Cystectomy.	Linen cloth.	Found at autopsy. Death on third day. No evidence of peritonitis. *d*.	Death.
59	1900	H. A. Kelly.	Pelvic suppuration.	Marine sponge.	Some days later, wound was reopened because of disturbance. Sponge found and removed. *c*.	Recovery
60	1900	Kelly.	Ovarian cyst.	Large gauze pad.	Two and a half months later, operation for abdominal mass. Mass contained sponge and abscess. *c*.	Recovery

ABDOMINAL SECTION. SPONGES LEFT.

No.	Date of Report.	Operator*	Character of Operation.	Article Lost.	When and How Removed.	Result.
61	1900	Kelly.	Ovarian cyst and appendicitis.	Gauze pad.	Five days later, operation for fever and a mass. In mass was sponge and abscess. *c*.	Death.
62	1900	Assistant to Kelly.	Fibroid of abdominal wall	Gauze, 360 gm. weight.	One month later, secondary operation for mass in abdomen. Contained sponge and abscess. *c*.	Recovery
63	1900	?	?	Sponge.	Reeves Jackson described two cases in which a sponge was found at autopsy. *a*.	Death.
64	1900	?	?	Sponge.	See preceding note. *a*.	Death.
65	1900	Spencer Wells.	?	Sponge.	Sponge missed. Abdomen reopened next day and sponge found. *a*.	Recovery
66	1900	Winkle.	Myomectomy.	Sponge.	Found at autopsy. Details not given. *a*.	Death.
67	1900	?	Wound of omentum.	Sponge.	Two weeks later, sponge was extracted from an abdominal sinus. *a*.	?
68	1900	?	?	Gauze napkin.	Found at autopsy by Kijweski. Details not given. *a*.	Death.
69	1900	?	?	Gauze.	Przewoski found gauze in cavity at three autopsies following abdominal section. *a*.	Death.
70	1900	?	?	Gauze.	See preceding note. *a*.	Death.
71	1900	?	?	Gauze.	See preceding note. *a*.	Death.
72	1900	Krasowski.	?	Sponge.	Prof. Krasowski was legally proceeded against for leaving a sponge in the abdomen. *a*.	?
73	1900	Frankenhauser.	Myomectomy.	Sponge.	Removed by secondary operation. Details not stated. *a*.	Recovery
74	1900	Bier.	Tubal pregnancy.	Mull compress, 1x1½ m.	Six months later, secondary operation. Compress found within intestine. *c*.	Recovery
75	1900	Bier.	Pelvic tuberculosis.	Gauze strip.	Long time afterward, gauze passed per rectum. *c*.	Recovery
76	1900	?	Two laparotomies, pyosalpinx.	Iodoform gauze, 52x44 cm.	Secondary operation for intestinal obstruction by Chaput. Gauze found within intestine. Intestine incised. *c*.	Recovery
77	1900	Atlee.	Ovariotomy.	Sponge.	Found at autopsy. At operation a sponge was torn in two by an assistant. *a*.	Death.
78	1900	Borysowicz.	Uterine fibroid.	Gauze sponge.	Three weeks later, sponge was passed per rectum. Lawsuit threatened. *a*.	?
79	1900	Karl Braun.	?	Sponge.	Found at autopsy. *a*.	Death.
80	1900	?	?	Sponge.	Found at autopsy. Reported by W. T. Bull. *a*.	Death.
81	1900	?	?	Gauze napkin.	Found in a secondary laparotomy by Dmochosky. *a*.	?
82	1900	George J. Engelmann.	Ovarian cyst.	Small sponge.	Sponge missed at operation. Searched for carefully but not found. Found at autopsy four days later. *a*.	Death.
83	1901	Beck.	Fibroid and pyosalpinx.	Sponge.	One month later, sponge was extracted from an abscess in scar.	Recovery
84	1901	?	?	Sponge.	Sponge finally passed per rectum. Cited by Beck, who was called to see patient by Leusman.	?
85	1901	Everke.	Pyosalpinx.	Gauze compress.	Later recovered by secondary operation. Details not given. Lawsuit. *c*.	Recovery
86	1901	Everke.	Cesarean section.	Napkin.	Found at autopsy. Death on fifth day from splanchnic irritation. No sepsis. *c*.	Death.
87	1901	Le Conte.	Tubercular peritonitis.	Gauze strip, 1 yd. wide and 5 ft. long.	Year later, strip removed from a persistent fecal fistula. Suggestion made that accident was beneficial to patient. *b*. *c*.	Recovery
88	1901	M. D. Mann.	?	Flat sponge.	Removed next day. No harm resulted. *b*. *c*.	Recovery
89	1901	?	?	Gauze pad.	Cited by M. D. Mann. *b*. *c*.	Death.
90	1901	?	?	Gauze pad.	Cited by M. D. Mann in his letter to Schachner. *b*. *c*.	Death
91	1901	?	?	Gauze pad.	Some months later, pad was discharged through sinus in scar. Cited by M. D. Mann. *b*. *c*.	Recovery
92	1901	H. C. Coe.	?	Large gauze pad.	Four weeks later, pad was felt under scar, and removed. *b*. *c*.	Recovery
93	1901	Coe.		Gauze sponge.	Particulars not given. *b*. *c*.	Recovery
94	1901	Coe.		Gauze pad.	Particulars not given. *b*. *c*.	Recovery
95	1901	Roberts.	Hysterectomy.	Sponge.	One week later, sponge was extracted from an abscess in the wound. *b*. *c*.	Recovery

ABDOMINAL SECTION. SPONGES LEFT.

No.	Date of Report	Operator*	Character of Operation.	Article Lost.	When and How Removed.	Result.
96	1901	Roberts.	Pelvic inflammation.	Pad.	Found at autopsy, by Irwin Abell. Death 78 hours after operation, with symptoms of ileus. *b. c.*	Death.
97	1901	F. W. Samuel.	Fibroid and pyosalpinx.	Flat sponge.	Found at autopsy. Death the third day, with symptoms of nephritis. *b. c.*	Death.
98	1901	H. Grant.	Gunshot wound of abdomen.	Two sponges.	Found at autopsy. Patient died a few hours after operation. *b. c.*	Death.
99	1901	T. S Bullock.	Ventral hernia.	Gauze pad, 7x5 inches.	Eight days later, pad was extracted from a sinus in the wound. *b. c.*	Recovery
100	1901	?	Appendicitis.	Gauze pad.	Three weeks later pad appeared at drainage wound and was extracted. *b. c.*	Recovery
101	1901	Weir.	Appendicitis.	Sponge.	Details not given. *b. c.*	Death.
102	1901	Weir ?	?	Gauze pad	Removed in five days. Details not given. *b. c.*	Recovery
103	1901	Weir.	?	Gauze pad.	Five months later, pad was removed. Details not given. *b. c.*	Recovery
104	1901	?	?	Sponge.	In his letter to Schnachner, Weir cites two case in which he removed a sponge. *b.*	Death.
105	1901	?	?	Sponge.	See preceding note. *b.*	Death.
106	1901	R. Matas.	Appendicitis.	Iodoform-gauze strip.	Six months later, strip was extracted from a persistent sinus. *b. c.*	Recovery
107	1901	G. R. Fowler.	?	Gauze pad.	In letter to Schnachner, Fowler mentions three cases. Details not given. *b. c.*	?
108	1901	Fowler.	?	Gauze pad.	See preceding note. *b. c.*	?
109	1901	Fowler.	?	Gauze pad.	See preceding note. *b. c.*	?
110	1901	Vander Veer.	?	Sea sponge.	Patient died of peritonitis. *b. c.*	Death.
111	1901	Vander Veer.	Carcinoma of uterus.	Sponge.	One year later, secondary operation for recurrence of carcinoma. Sponge found. *b. c.*	?
112	1901	C. P. Noble.	?	Sea sponge.	Some weeks later, secondary operation and sponge found. *b. c.*	?
113	1901	?	?	Two sponges.	Cited by J. B. Murphy. Details not given. *b. c.*	?
114	1901	?	?	Piece of gauze.	Cited by J. B. Murphy. *b. c.*	?
115	1901	E. Lewis.	?	Sponge.	Fourteen days later, sponge extracted from sinus in scar. *b. c.*	Recovery
116	1901	A. MacLaren.	Appendicitis.	Piece of gauze.	Three weeks later, gauze was extracted from drainage tract. *b. c.*	Recovery
117	1901	Gerster.	Inoperable carcinoma.	Iodoform packing.	Found at autopsy. Details not given. *b. c.*	Death.
118	1901	?	?	Gauze pad and attached clamp.	Cited by Frank Hartley. Details not given. *b. c.*	?
119	1901	B. C. Hirst.	?	Sponge.	Found at autopsy. Sponge torn in two by assistant. Sponges counted and reported "correct." *b. c.*	Death.
120	1901	?	?	Gauze pad.	After some weeks, secondary operation for fecal fistula. A few days later, the sponge was passed per rectum. *b. c.*	?
121	1901	W. M. Polk.	?	Half of a sponge.	Sponge torn in two at operation. Details not given. *b. c.*	?
122	1901	?	Ectopic pregnancy.	Pad.	Later extracted from a persistent sinus in scar. Observed by A. J. Boyd. *b. c.*	Recovery
123	1901	W. T. Bull.	Cholecystostomy.	Large flat sponge	Five days later, discovered in drainage tract and removed. *b. c.*	Recovery
124	1901	Baldwin.	?	Sponge.	Baldwin, of Columbus, Ohio, was made defendant in a law suit because of sponge left in abdomen. *b.*	?
125	1901	Munde.	Sarcoma of kidney. Laparotomy	Towel, 1x2 ft.	Four weeks later removed from a suppurating sinus. *b. c.*	Recovery
126	1901	Price.	?	Sponge.	Sponge missed soon after closing wound. Reopened and sponge removed. *b. c.*	Recovery
127	1901	Price.	?	Sponge.	Similar to preceding case. Price cites two cases in his letter to Schnachner. *b. c.*	Recovery
128	1902	Russell.	Oophorectomy.	Lint sponge.	Six months later, secondary operation. Sponge removed from within intestine. *c.*	Recovery
129	1902	Lindfors.	Extrauterine pregnancy.	Compress.	Later extracted from a pelvic abscess by vaginal incision. *c.*	Recovery
130	1903	Kayser.	Postoperative hernia.	Gauze roll.	Two and a half months later, secondary operation. Gauze roll within intestine. Resection. *c.*	Recovery

ABDOMINAL SECTION. SPONGES LEFT.

No.	Date of Report.	Operator*	Character of Operation.	Article Lost.	When and How Removed.	Result.
131	1903	**Beckmann.**	?	Napkin.	Beckman stated that he had three cases in which napkin was lost in abdominal cavity.	?
132	1903	**Beckmann.**	?	Napkin.	See preceding note. No details given.	?
133	1903	**Beckmann.**	?	Napkin.	See preceding note. No details given.	?
134	1903	**Fick.**	**Perityphilitis.**	Cotton compress.	Secondary operation for fecal fistula. Sponge found within intestine. *c.*	**Recovery**
135	1903	**Gruning.**	**Uterine myoma.**	Marley tampon.	Some weeks later, after pain in lower abdomen, tampon passed per rectum.	**Recovery**
136	1903	**Schaefer.**	**Myomectomy.**	Gauze napkin.	Found at autopsy, two years later. Accompanied by intestinal necrosis. *c.*	**Death.**
137	1904	**Ahfeld.**	?	Gauze sponge.	Prof. Ahfeld was subjected to a lawsuit in 1903, because of a sponge left in the abdomen. *c.*	?
138	1904	**Corson.**	**Ectopic pregnancy.**	Sponge, 18x36 in.	Two and a half months later, sponge passed per rectum. *d.*	Recovery
139	1904	?	**Kidney operation. Laparotomy.**	Sponge, 1 meter long.	Forty-six days later, secondary operation for painful mass and ileus. Sponge within intestine. Resection. *d.*	Recovery
140	1904	Reise.	Extrauterine pregnancy.	Sponge.	Ten months later, secondary operation for ovarian cyst and inflammation. Sponge found near sigmoid. *d.*	Recovery
141	1904	Thorne.	Abdominal tumor.	Sponge.	After several months, secondary operation. Sponge found. Lawsuit. *d*	Recovery
142	1904	Winter.	Hysterectomy for fibroid.	Sponge.	Found at autopsy. Death three weeks after operation, of embolus. *d.*	Death.
143	1906	Waldo.	Hysterectomy for fibroid.	Towel.	Some weeks later was extracted through sinus in scar. Sponges counted and "correct." *d.*	Recovery
144	1906	?	Salpingectomy.	Iodoform-gauze strip.	Two years later, found at secondary operation. Cited by Waldo. *d.*	?
145	1906	Ward.	?	Sponge.	Later discharged per vaginam.	Recovery
146	1906	Brothers.	Ectopic pregnancy.	Pad.	Six weeks later, pad protruded from opening in lower part of scar.	?
147	1906	Grandin.	?	Pad.	Two and a half years later, found encysted in the omentum.	Recovery
148	1906	Grandin.	?	Towel, with hospital name on.	Three weeks later, secondary operation for mass under liver. Mass contained towel.	Recovery
149	1906		? ?	Sponge.	One and a half years later, operation by Amann for supposed fibroid. Proved to be a sponge. *d.*	Recovery
150	1906	Landau.	Ovariotomy.	Napkin.	Eighteen weeks later, secondary operation for fecal a fistula. Sponge found. *d.*	Recovery
151	1907	MacLaren.	Hysterectomy.	Sponge, 12 in. square	Found at autopsy, up under the liver. Death on the fourth day.	Death.
152	1907	Crossen.	Pelvic suppuration.	Gauze pad.	Two weeks later, appeared in drainage tract and was extracted.	Recovery
153	1907	d'Antona.	Carcinoma of liver.	Gauze napkin 40x70 cm.	Found at autopsy. Death in one month from carcinoma, peritonitis and adjacent pleuritis. Two lawsuits. *d.*	Death.
154	1907	Dobrucki.	Ovarian cyst.	Sponge.	Three weeks later extracted through sinus in scar. *d.*	Recovery
155	1907	Janczewski.	Ovarian cyst and pyosalpinx.	Gauze napkin.	Twenty-one days later removed from abscess in wound. (Janczewski, assistant to Neugebauer.) *d.*	Recovery
156	1907	Poten.	Myomectomy.	Sponge.	Found at autopsy. Death after six weeks from bronchitis. No peritonitis. *d.*	Death.
157	1907	Prochownick.	?	Sponge.	Sponge missed. Wound immediately reopened and sponge found. *d.*	Recovery
158	1907	Russian operator.	?	Gauze compress.	No details. Reported by Neugebauer. Operator did not wish name given. *d.*	?
159	1907	Polish operator.	?	Gauze compress.	Details not given. Reported by Neugebauer. *d.*	?

Abdominal Section. Sponges Left.

No.	Date of Report.	Operator*	Character of Operation.	Article Lost.	When and How Removed.	Result.
160	1907	Sippel.	Broad ligament tumor.	Iodoform-gauze pack.	Six weeks later, the gauze strip passed per rectum. *d.*	Recovery
161	1907	Berlin operator.	Adnexal mass.	Gauze strip.	Later extracted from the bladder by W. Stuckel. *d.*	?
162	1907	L. Meyer.	Cesarean section.	Mull napkin.	Found at autopsy. Death on the fourth day of peritonitis. Sponges counted and "correct." *d.*	Death.
163	1908	?	?	Five-foot roll of gauze.	Some months later removed by secondary operation, which was witnessed by J. C. Morfit.	?
164	1908	?	Appendicitis.	Iodoform gauze, 1 sq. yd.	Found at secondary operation in Mount Sinai Hospital. Witnessed by M. G. Seelig.	Recovery
165	1908	?	Appendicitis.	Piece of sea sponge.	Extracted from sinus at Mt. Sinai Hospital, in 1900, by M. G. Seelig.	Recovery
166	1908	Schooler.	?	Pad, 16 in. sq.	Details not stated. Patient awarded $1500 damages by a jury.	Recovery
167	1908	Hageboeck.	Appendicitis.	Sponge.	Abscess formation and death of patient. Three trials for $50,000 damages.	Death.
168	1908	Findley.	?	Strip of gauze, 5 ft. long.	Ten days later, found at secondary operation. Sponges counted and stated "correct," but one roll had been cut in two.	Recovery
169	1908	?	Ovarian cysts (bilateral.)	Two gauze pads.	Removed by secondary operation, six weeks later. Followed by fecal fistula, which finally healed.	Recovery
170	1908	?	Pelvic tuberculosis.	Small sponge.	One year later, secondary operation for persistent sinus. Sponge found. Death from operation.	Death.
171	1908	?	Gallstone operation.	Small sponge.	Found at autopsy. Death after four days from peritonitis.	Death.
172	1908	Rieck.	Extrauterine pregnancy.	Compress, 15x20 cm.	No symptoms. Four months after operation, compress passed per rectum.	Recovery

Abdominal Section. Forceps and Other Articles Left.

173	1880	Mariani.	Ovariotomy.	Drainage tube.	Drainage tube slipped inside and was overlooked. One week later it passed per rectum. *a.*	?
174	1886	Olshausen.	Ovariotomy.	Forceps.	Ten months later passed per rectum, after only two weeks disturbance. *a.*	Recovery
175	1892	French surgeon.	?	Forceps.	Immediately after the operation, the abdomen was reopened to recover a forceps. *a.*	?
176	1896	MacLaren.	ectomy.	Artery forceps.	Two years later, secondary operation. Found forceps perforating cecum, ileum, and appendix. *a.*	Recovery
177	1896	?	?	Forceps.	Ferrier stated that one of his associates had recovered a forceps left in the abdomen.	?
178	1897	Morestin.	Salpingitis.	Artery forceps.	Three years later, forceps were passed per rectum, after persistent suffering. *a.*	Recovery
179	1898	Herczel.	?	Clamp.	One and a half years later, removed by secondary operation. *a.*	?
180	1898	?	?	Forceps.	Boldt stated in 1898 that he knew of five cases among colleagues, in which a foreign body was left. (Count two forceps.) *a.*	?
181	1898	?	?	Forceps.	See preceding note. *a.*	?
182	1898	?	?	Forceps.	Boldt stated that a pathologist in a N. Y. hospital had found a foreign body at autopsy in two cases. (Count 1 forceps, 1 sponge.) *a.*	Death. Death.
183	1898	?	?	Forceps.	Boldt mentioned two cases in which abdomen was reopened to recover article left. (Count 1 forceps, 1 sponge.) *a.*	?
184	1898	Nussbaum.	?	Drainage-tube.	Two months later, patient herself drew it out of an abdominal sinus, after a night of dancing. *a.*	Recovery

ABDOMINAL SECTION. FORCEPS AND OTHER ARTICLES LEFT.

No.	Date of Report.	Operator*	Character of Operation.	Article Lost.	When and How Removed.	Result.
185	1898	Bode.	?	Drainage-tube.	Tube slipped into wound and was forgotten. After a few days, wound was reopened and tube found. *a*.	?
186	1898	American surgeon.	?	Diamond ring.	Remained six months in the abdomen. Other details not given.	?
187	1899	Lassallette.	Large fibroid.	Forceps.	Found at autopsy. Criminal trial. Operator sent to prison. (See Legal Complications.) *c*.	Death.
188	1900	H. A. Kelly.	Hysterectomy.	Forceps.	Found in drainage tract after a few days. In operation to extract it, patient died from hemorrhage. *a*.	Death.
189	1900	G. Braun.	?	Bulldog forceps.	Forceps found at autopsy. *a*.	Death.
190	1900	Sepp.	Ovarian cyst.	Nelaton catheter.	Found in bladder with some silk ligatures, several months later. Catheter had been used to ligate pedicle. *a*.	Recovery
191	1900	Cushing.	?	Seal ring.	Some years after the laparotomy the ring was recovered by incision in vaginal vault. *a*.	Recovery
192	1900	Nussbaum.	?	Artery forceps.	Nine months later, passed per rectum. *a*.	?
193	1900	?	?	Piece of glass irrigator.	Two weeks later found at autopsy by Kyewski. Patient died with symptoms of nephritis. *a*	Death.
194	1900	?	?	Forceps.	Reeves Jackson mentions a case in which autopsy revealed a forceps left in the cavity. *a*.	Death.
195	1900	Spencer Wells.	Ovariotomy.	Artery clamp.	One month later, the clamp was found in the bladder. *a*.	?
196	1900	Spencer Wells.	?	Artery clamp.	Clamp missed. Wound reopened next day and clamp found. *a*.	Recovery
197	1900	Terrier.	?	Forceps.	Eight days later, forceps was discharged spontaneously from region of umbilicus. *a*.	?
198	1900	Terillon.	?	Forceps.	Neugebauer states that Terillon forgot a forceps in the abdominal cavity. *a*.	?
199	1900	Winkle.	?	Forceps.	Later discharged spontaneously from an abscess. *a*.	?
200	1900	?	?	Richelot clamp.	Details not given. Simply stated that clamp was left behind. *a*.	?
201	1900	Kosinski.	Ovariotomy.	Artery forceps.	Four months later forceps extracted from an abdominal abscess. *a*.	Recovery
202	1900	Kosinski.	Ovariotomy.	Two artery forceps.	Two secondary operations, in the second of which patient died of hemorrhage. Criminal trial. (See Legal Complic.) *a*.	Death
203	1900	?	Inoperable tumor.	Artery forceps.	Found at secondary operation by another operator, who related the case to Neugebauer. *a*.	?
204	1901	M. D. Mann.	?	Hemostat.	Removed in one hour after operation. No trouble resulted. *b. c.*	Recovery
205	1901	Schnachner.	Uterine fibroid.	Forceps.	Seven months later, secondary operation for ileus. Forceps found within intestine. Removed by incision. *b. c.*	Recovery
206	1901	?	?	Forceps.	Removed at autopsy, after a laparotomy. Witnessed by J. A. Wyeth. *b. c.*	Death.
207	1901	?	Strangulated hernia.	Forceps.	Eight and a half years later, part of forceps was extracted from an abdominal sinus. Cited by Ellison. *d*.	Recovery
208	1901	Nussbaum.	?	Scissors.	Later, secondary operation. Scissors found. Cited by Senn in letter to Schachner. *b. c.*	Recovery
209	1904	Prochownick.	?	Forceps.	Six months later half of forceps extracted from sinus in scar. *c*.	Recovery
210	1904	?	Myomectomy.	Pean forceps.	Six years later, secondary operation for ileus. Forceps found. Patient died. Reported by Hedlund. *d*.	Recovery
211	1906	?	Ovarian cyst.	Forceps	Seven years later, forceps felt through abdominal wall. Extracted by vaginal incision by Gruzdews. *d*.	Recovery
212	1906	?	?	Forceps.	Secondary operation later by Gruzdews, and forceps found. *d*.	?
213	1906	?	Ovariotomy.	Artery forceps	Ten and a half years later, secondary operation. Forceps perforating bowel. Reported by Stewart. *d*.	Recovery

ABDOMINAL SECTION. SPONGES AND OTHER ARTICLES LEFT.

No.	Date of Report.	Operator*	Character of Operation.	Article Lost.	When and How Removed.	Result.
214	1906	?	?	Artery forceps.	Six years later, death from intestinal necrosis. Forceps found at autopsy within bowels. Reported by LeGendre. *d*.	Death.
215	1906	?	?	Forceps.	Doyen did a secondary operation, and found forceps within intestine. Resection. *d*.	?
216	1906	?	?	Artery forceps.	Four months later, secondary operation by Ward for ileus. Forceps found.	?
217	1907	Dollinger.	Sarcoma of abdominal wall.	Forceps.	Nearly three years later (after two successful pregnancies) trouble from forceps, Operation. Death. Lawsuit. *d*.	Death.
218	1907	Kuestner.	Cyst of pancreas.	Forceps.	Six weeks later, forceps appeared at angle of scar and was extracted. *d*.	Recovery
219	1907	?	?	Forceps.	Found at autopsy. Death soon after operation, of shock. *d*	Death.
220	1907	?	Ovarian carcinoma.	Forceps.	Found at autopsy. Death after six days, of ileus and peritonitis. *d*.	Death.
221	1907	Paris surgeon.	?	Piece of an instrument.	Details not given, except that piece was left in abdomen at operation. Criminal trial. *d*.	Death.
222	1907	?	?	Pair of spectacles.	Three operations—in America, Germany, France. Frenchman found spectacles in abdomen. German was sued for damages *d*.	Recovery

VAGINAL OPERATIONS. SPONGES AND OTHER ARTICLES LEFT.

223	1886	Veit.	Vaginal hysterectomy.	Rubber drain.	Four months later, drain passed per rectum. *d*.	Recovery
224	1886	Veit.	Vaginal hysterectomy.	Rubber drain.	Later expelled from the bladder. Details not given. *d*.	Recovery
225	1897	Friend of H. C. Coe.	Vaginal hysterectomy.	Gauze sponge.	Two days later, on removing clamps, one was found to be a sponge-holder minus the sponge. Laparotomy, found sponge under liver. *a*.	?
226	1898	Erlach.	Vag. operation for fibroid.	Iodoform-gauze pack.	Nine days later, strip found in vaginal abscess. Nine months later, another strip removed from bladder. *c*.	Recovery
227	1898	Boldt.	Vag. drainage after abdom. hysterectomy.	Gauze drain, inserted third day.	Drain forgotten. Two months later the gauze was passed per rectum. *a*.	Recovery
228	1898	Rydygier.	Vaginal hysterectomy	Sponge.	Seven weeks later, sponge was discharged from vaginal sinus. Patient finally died of pyemia.	Death.
229	1899	Meinert.	Pelvic tuberculosis.	Iodoform-gauze strip.	Five months later, extracted from vaginal sinus. *a*.	Recovery
230	1899	?	Adnexal trouble.	Compress.	One year later, extracted from a vaginal sinus. Cited by Meinert. *a*.	Recovery
231	1899	Schramm.	Pyosalpinx.	Tampon.	Ten weeks later, tampon came out while patient was dancing. *c*.	Recovery
232	1900	Hillmann.	Pyosalpinx.	Gauze sponge.	Found later in bladder, accompanied by violent cystitis. *c*.	Recovery
233	1901	?	Pelvic inflammation.	Sponge.	Later secondary operation (abdominal section) and sponge found in pelvis, by L. Frank. *b*. *c*.	Recovery
234	1901	Pryor.	Vaginal operation.	Gauze.	Details not given. Cited by W. R. Pryor. *b*. *c*.	?
235	1901	Assistant to Pryor.	Vag. operation.	Gauze.	Details not given. Cited by Pryor. *b* *c*.	?
236	1901	Assistant to Pryor.	Vag. operation.	Gauze.	Details not given. Cited by Pryor. *b*. *c*.	?
237	1902	?	Uterine tumor.	Tampon.	Four months later, tampon was extracted per vaginam. Reported by Gudbrod. *d*.	Recovery
238	1906	Brothers.	Vaginal hysterectomy.	Gauze drain.	Several months later, drain was extracted through vaginal sinus.	Recovery
239	1907	MacLaren.	Pelvic suppuration.	Iodoform-gauze strip.	Two months later, the patient extracted a twelve-inch strip of gauze from vagina.	Recovery
240	1908	Calmann.	Vaginal hysterectomy.	Sponge, slipped from holder.	Extensive palpation per vaginam, extending to liver and kidneys. Not found. Removed later by laparotomy.	?

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a. Cited by Neugebauer, 1900.
b. Additional cases, cited by Schachner, 1901.
c. Cited by Neugebauer, 1904.
d. Cited by Neugebauer, 1907.
*Supposed to be the operator. In some cases the record is not entirely clear on this point.

References for all the cases cited, and also other items of importance in connection with this subject, are given in the original article.* In a few cases reports obtained from different sources were contradictory, making it difficult to determine positively certain details where the original report was not accessible. Since making this list many other cases have been brought to my notice, but it is not necessary to include them. My object is not to make a complete list, but simply to present actual cases in such number and variety that operators will be led to pause and think on this subject.

VAGINAL SECTION.

Vaginal section is incision through the vaginal wall into the peritoneal cavity. If the entrance is made behind the cervix, it is known as "posterior" vaginal section. If the opening is made in front of the cervix, it is known as "anterior" vaginal section.

In some cases of pelvic disease it is better to enter the peritoneal cavity from below—i. e., by vaginal section; while in other cases it is better to enter from above—i. e., by abdominal section.

ADVANTAGES

Of Vaginal Section.

The advantages of Vaginal Section, in suitable cases, are as follows:

1. Less danger. There is less exposure and handling of the intestines and peritoneum. In vaginal section the manipulations are nearly all in the pelvic cavity, while in abdominal section the central portion of the great peritoneal sac is invaded; theerfore, in vaginal section there is less shock and less danger of general peritonitis. Again, if infection should develop after vaginal section, it is very likely to be "walled off" from the general peritoneal cavity and to cause simply local suppuration, whereas when infection appears after abdominal section it is very likely to take the form of an acute general peritonitis.

2. Evacuation of pus without contamination of peritoneal surfaces. This is one of the strongest points in favor of vaginal section in suitable cases. As a rule, when there is a large collection of pus that can be reached from below, it should be evacuated that way. This is particularly important if the pus be of recent origin. In such a case it is very important to prevent soiling of the peritoneal surfaces with this infectious fluid. This is accomplished by opening from below.

Again, in many cases of pelvic suppuration the pelvic cavity, containing the abscess, is entirely shut off from the general peritoneal cavity by a wall or roof of inflammatory exudate, which binds together the upper pelvic

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*Abdominal Surgery Without Detached Pads or Sponges; A Practical Method of using Gauze-strips so as to Eliminate the Possibility of Any Gauze Being Left in the Abdomen. By H. S. Crossen, M. D.—*American Journal of Obstetrics*, vol. LIX, p. 58.

structures. When operating from below we work beneath this roof, which protects the general peritoneal cavity from contamination.

3. Better drainage. In vaginal section the opening is made at the lowest part of the pelvic cavity—the best place for drainage.

4. Quicker convalescence. There is less disturbance of the intra-abdominal structures. Also, the wound is smaller, better protected and supported by surrounding parts, and is not so likely to be followed by hernia.

5. No visible scar. This is of some importance. A long scar marking the site of a former opening into one's interior is not particularly pleasant for the patient to contemplate. It is an ever-present reminder of the disease that was present and of the operation. It is well to avoid making such a scar in cases where other methods are just as good.

6. Vaginal section combines easily with certain plastic operations, which are sometimes indicated at the same time.

DISADVANTAGES.

The disadvantages of vaginal section are:

1. Lack of room in the operative field. The manipulations are cramped and are carried out with less certainty of accomplishing the desired result.

2. Imperfect exploration of pelvis and lower abdomen. The pelvic structures are harder to reach and the lower abdominal structures (appendix, etc.) can not be satisfactorily reached at all. And of the structures reached, the determination of their condition must be usually made almost altogether through the sense of touch, for the structures can be only imperfectly exposed to sight.

3. Remnants remain. Where the adhesions are extensive there is likely to be imperfect work unless the uterus is removed, and in many cases it is not advisable to remove the uterus.

4. There is not so good a chance to determine whether or not the conditions are favorable for conservative work on the ovaries or tubes, and the work itself, when indicated, can not as a rule be so satisfactorily executed.

5. Appendix affections can not be satisfactorily handled. The appendix is diseased and requires removal in a considerable proportion of patients with pelvic disease.

SELECTION OF CASES.

The operative cases in which I consider the **vaginal operation preferable** to the abdominal are:

1. Acute infection in the pelvis that has not yet spread to the general peritoneum. This acute severe pelvic peritonitis is seen principally in cases of sepsis following labor or abortion. If general peritonitis is present, abdominal section is preferable.

2. A collection of pus low in the pelvis within easy reach of the fingers,

particularly if there is a probability that the general peritoneal cavity is well walled off above.

3. For exploration of the pelvis in certain doubtful cases when it is evident that all the information required can be determined from below.

The operative cases in which I consider **abdominal section preferable** to vaginal section include:

1. Chronic inflammatory lesions, with or without a collection of pus.
2. Cases of adherent retrodisplacement of the uterus.
3. Cases in which conservative work on ovaries or tubes is probably required.
4. Ovarian and broad ligament and uterine tumors (except certain fibroids that can be satisfactorily removed from below).
5. Extra uterine pregnancy (except where all that remains is a walled-off hematocele).
6. Cases complicated with, or probably complicated with, appendix trouble.
7. Obscure cases, requiring thorough examination of the pelvis and lower abdomen.

PREPARATIONS

For Vaginal Section.

The preparations for vaginal section are practically the same as for abdominal section, except that, in the preparation of the operative field, the external genitals and the vagina are prepared instead of the abdomen.

The patient receives an antiseptic douche one to three times daily, depending upon the amount and character of the discharge. The afternoon or evening before the operation the external genitals and adjacent surfaces are shaved and then carefully scrubbed with green soap and warm water, using cotton-balls or a soft brush. The vagina also is cleansed with cotton-balls held in the forceps. This cleansing should be done gently, so as not to abrade the vaginal surface and thus invite infection at points in the operative field. No alcohol nor ether is used here, as it would cause too much irritation. After the careful cleansing with soap, the soap is cleared away with sterile water and the vagina and external genitals are cleansed with a bichloride solution (1-2000). After the cleansing the parts are covered with bichloride pack (cotton wrung out of 1-5000 bichloride solution). Some prefer to pack the vagina at this time with antiseptic gauze, the packing to remain in place until the patient is anesthetized for the operation. If there is much discharge, however, the packing holds the discharge in the vagina, where it decomposes more or less; consequently, in such cases the packing is not advisable.

In certain complicated cases and in doubtful cases the abdomen also should be prepared, as it may be necessary to employ abdominal section in order to deal satisfactorily with the conditions found.

After the patient is under the anesthetic the external genitals and vagina are scrubbed thoroughly, first with the soap solution and later with the bichloride solution. This cleansing under anesthesia (Figs. 574, 575) is the most important step in the antiseptic preparation, for it can be made so much more thorough than before anesthesia when there is likely to be pain and resistance.

STEPS

In Vaginal Section.

The steps in the operation are essentially the same as for abdominal section, changing the field from the abdominal surface to the depths of the vagina. The steps are:

1. Anesthesia.
2. Exposure of operative field by suitable retractors.
3. Incision and entrance into the peritoneal cavity.
4. Exploration.
5. Correction of pathological condition.
6. Restoration of structures to approximately normal relations.
7. Closure of incision or drainage, as thought preferable in that particular case.
8. Dressing.

CONSERVATIVE SURGERY

of the Ovaries, Tubes, Uterus.

By the term "conservative surgery" is meant the conserving or saving of undiseased portions of ovaries and tubes, or of portions that are somewhat affected, but not enough to threaten serious trouble should they be left. A "conservative operation," then, is an operation that saves an organ or part of an organ that would otherwise (by the regular radical operation) be wholly removed. Conservative surgery of the ovaries and tubes is of rather recent development, and in order to bring it before you in its proper relation I shall recall briefly the steps preceding it.

Before the eighteenth century, operation for the removal of ovarian tumors had been suggested by a number of physicians, but it had never been put into practice. Later, the celebrated John Hunter and the equally celebrated John Bell both advocated the operation, but neither of them ventured to perform it.

The first ovariotomy in the world was performed by Ephraim McDowell, a native of Virginia, practicing in Kentucky. McDowell had attended the lectures of John Bell in Edinburg in 1749; and was convinced of the correctness of his teacher's views in regard to the removal of ovarian tumors. He returned to Kentucky and practiced his profession without special incident until 1808, when he was confronted by a case of ovarian tumor requiring operation. After giving the matter careful consideration and making full explanation to the patient, he performed the operation, and the patient recovered. From that time the practice gradually spread over the civilized world, and after half a century ovariotomy became comparatively frequent The ovaries were removed, not only for tumors, but for all sorts of ovarian diseases, from the most serious to the most trivial. In fact, it became quite common, later, to remove practically normal ovaries for various nervous disturbances which it was thought might be due to them (Battey's operation).

After a time, however, it began to dawn upon the profession that the ovaries had another function than ovulation, and that when the ovaries were removed the patient was deprived, not only of ovulation, but also of some factor which has a marked influence on the general health. Gradually the trophic function of the ovary, explained when speaking of the physiology of the ovary, was worked out. From the facts thus far established we know that, aside from the consideration of ovulation or pregnancy, an ovary should be preserved wherever possible on account of the influence it exerts over the patient's health, particularly over her nervous system.

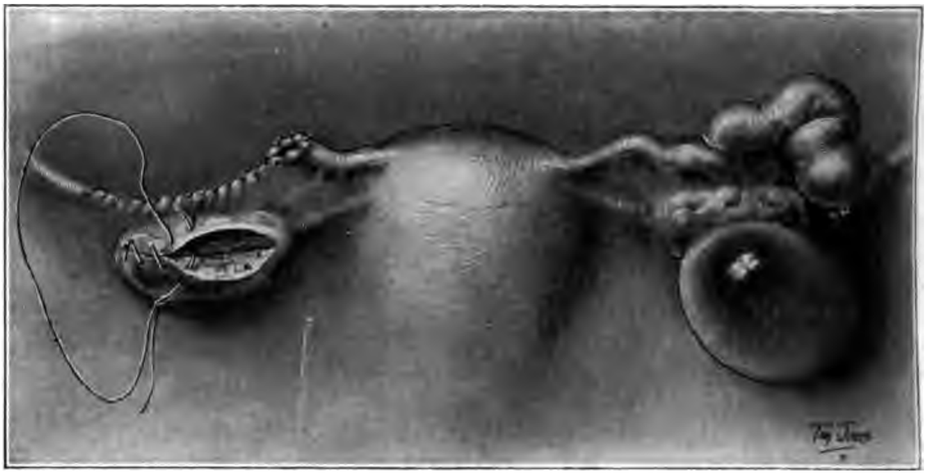

Fig. 728. Conservative Surgery of Ovary and Tube. Excision of damaged portion of tube, showing how the end of the stump is split and sewed open. Excision of cyst from ovary, with preservation of the unaffected portion of the organ. Lesions shown on right side and conditions after excision on the left side.

The objects for which conservatism is thus practiced in pelvic surgery are three:

1. Preservation of the possibility of **pregnancy**. To make pregnancy possible, there must be one ovary, or a functionating piece of one ovary, and a patent tube. The patent tube may be on the same side as the ovary or on the opposite side. It may be a normal tube or it may be simply the stump of a tube, the remainder of the tube having been removed on account of some disease (Fig. 728).

Under all these circumstances pregnancy is possible and has taken place in a number of instances. Of course, it is not as likely to take place as in a normal individual, but still the patient has a chance of becoming pregnant.

Another point, sometimes overlooked, is that, even though no pregnancy results from these efforts at conservatism, the simple fact that the patient may become pregnant—that pregnancy is still possible—conduces much to her peace of mind.

2. Another effect sought by conservative pelvic surgery is continuation of **menstruation.** Even though the hope of pregnancy must be sacrificed on account of disease necessitating the complete removal of both tubes, if an ovary or functionating piece of an ovary can be left in the pelvis with the uterus, menstruation continues, though pregnancy is impossible.

3. Still another effect sought by this conservative surgery is the continuation of the **trophic influence** of the ovary. When the uterus must be removed, pregnancy and menstruation are of course no longer possible. However, if an ovary or a functionating piece of an ovary can be saved, the trophic influence of the ovary is preserved, provided that the retained portion of the ovary continues its function—i. e., continues to form ova and corpora lutea.

This latter fact must be kept in mind. The mere leaving of a portion of the ovary does not insure a continuation of menstruation or of the trophic influence. To produce the desired result, the portion of ovary left must continue to functionate. If its nutrition is so interfered with that ovulation does not continue, it is just the same as though no ovarian tissue had been left. Some time ago there came to me a woman who had been operated on in a distant city. The operator had told her that she would menstruate, as part of one ovary had been left in place. Menstruation, however, ceased entirely after the operation, and when I saw the patient she was suffering from the symptoms of the artificial menopause. She was inclined to think that both ovaries had been completely removed and to blame the operator for "deceiving" her. It was evidently, however, one of those cases in which the portion of ovary preserved had not survived in condition to continue its functions, and the patient's confidence in her former physician was restored by this explanation.

4. Another form of conservative work is the preservation of a **part of the corpus uteri** in certain fibroid cases ordinarily subjected to supravaginal hysterectomy. Instead of removing all of the uterus except the cervix, the amputation of the affected portion is made so as to preserve the lower part of the corpus. Again, the uterus may be split in the median line, the tumor and affected portion removed and the remaining lateral portions, with as much endometrium as possible, preserved and sutured together. In this way the preservation of menstruation, which is an important matter in young women, may be attained in certain cases.

Conservative pelvic surgery in its various forms is still in the developmental stage. As more and more of this conservative work is done and remote results recorded, we shall be able to determine more accurately its limitations, and to say in just what conditions it is advisable and in what conditions not advisable.

CHAPTER XVI.

AFTER-TREATMENT IN OPERATIVE CASES.

AFTER-TREATMENT IN ABDOMINAL SECTION.

The details of the care of a patient after abdominal section may be divided into (A) the regular after-treatment and (B) the care in special conditions.

(A.) REGULAR AFTER-TREATMENT.

First Day. During the operation the bed which the patient is to occupy should be warmed with hot-water bottles placed under the blankets. When the patient is placed in bed the hot water bottles are distributed about her, to maintain the heat and diminish shock. Care should be taken that there is no leakage from any bottle, and that a thick blanket is everywhere between the hot bottles and the patient. Much discomfort and even serious injury may follow a burn from a hot-water bottle, caused by the bursting of a bottle or leakage from a bottle, or a too thin protective covering between the bottle and the patient. In several instances legal complications have resulted, involving the nurse or the hospital, or the physician.

The patient's head should be low (no pillow under it) until she has recovered from the anesthetic. Keep the patient quiet and let her sleep as long as she will from the anesthesia. If the patient vomits, she should be turned well over on the side to cause the vomited material to run out of the throat, that there may be no chance of its getting into the larynx and choking her. Death may occur from this cause. To diminish the thirst, swab the interior of the mouth frequently (when the patient is awake) with cold water, either plain or acidulated with a few drops of vinegar or lemon juice.

The **orders** for the first day are usually about as follows:

If in much pain, give codeine phosphate ½ gr. to ¾ gr. hypod., and repeat after two hours as necessary to give rest.

If vomiting. turn well on one side.

May have water as soon as she wishes it—hot or cold, as best retained, half an ounce every fifteen minutes when desired, unless vomiting persistently.

Catheterize only if necessary. When bladder fills, employ usual expedients to assist urination (propping up in bed, warm water to genitals, pressure on bladder, etc.).

It is not necessary ordinarily for the patient to be kept strictly on her back. After a few hours, if very tired of the one position, she may be propped partly to one side or the other occasionally. But she must not be allowed to develop that restlessness that insists on constantly changing from one side to the other in an endeavor to find a comfortable position. No position is very comfortable under the circumstances and the too frequent changing increases the discomfort.

The patient should be quieted as much as possible without medicine, in order that the administration of sedatives may be avoided or kept within small amount. The nurse can do much, by arranging the patient comfortably in bed and directing her frequently to keep the eyes closed and to nap as much as possible. If there is such severe pain that the codeine does not give rest, morphia, in 1-6 gr. doses, may be given, but that is rarely necessary. If preferred, the sedative may be given by suppositories, but its effect is not so prompt and cannot be so accurately graduated.

As a rule I prefer to let the patient have water in small doses as soon as she wishes it. It diminishes the thirst and helps to supply the system with needed fluid. Occasional vomiting does no harm; rather it is beneficial in that it helps to clear out the ether-saturated mucus, the retention of which increases stomach irritation and disturbance. If there is persistent vomiting, and especially if there is persistent epigastric pain, a stomach tube should be introduced and the stomach washed out with a quart of normal saline solution. This stomach washing (lavage) has come to be recognized as a most important measure in post-operative treatment. It is the only effective treatment for the serious complication of acute dilatation of the stomach (page 961), and in any case of persistent stomach irritation it adds much to the patient's comfort by clearing out the irritating material.

If the patient can not take water by mouth, the thirst may be diminished by saline solution per rectum by the drop method (proctoclysis). If the patient is in shock, start the proctoclysis and employ the other measures for that condition (page 959).

Second Day. During the second day the orders previously given are continued unless there is some special reason for modifying them. The patient may take water more freely, and the liquid nourishment is now begun and gradually increased as the stomach will bear it. For this purpose peptonized milk may be used, or milk and lime-water (half and half), or albumen water or beef tea—one or two ounces about every two hours, hot or cold as best retained.

If the patient has to be catheterized, it is well to give some reliable urinary antiseptic to diminish the danger of cystitis. If gas in the intestines is troublesome, a rectal tube may be introduced. If the operation was an emergency one, where there was no opportunity for preliminary preparation of the intestinal tract, it may be advisable to secure a bowel-movement within the second twenty-four hours, in which case the calomel is now begun. Ordinarily, however, that is preferably postponed until the third day.

Third Day. At the beginning of the third day start the patient on the purgative regimen, indicated below, that a bowel movement may be secured some time during this twenty-four hours. If the quantity of urine is good, the frequency and duration of the proctoclysis (if it is being used) may be reduced.

The **orders** for the third day are usually about as follows:

- Calomel ¼ gr. every half hour till eight doses are taken. Four hours after last dose of calomel give a high enema of magnesium sulphate (1 oz.), glycerine (2 oz.) and water (4 oz.). This is to be retained twenty minutes if possible.
- If there is not a satisfactory bowel movement from this enema, give the patient a teaspoonful of Rochelle salt every two hours till three doses are taken, and four hours after the last dose repeat the magnesium sulphate enema.
- Continue the codeine if necessary to give rest.
- Urotropin 5 gr. in two ounces of water every eight hours.

Fourth Day. Ordinarily by this time one or two good bowel movements have been secured, and the patient has become fairly comfortable. If the kidneys are secreting well, the proctoclysis may be stopped. All medicines may now be given by mouth. The patient may be propped up as necessary, to aid in urination if she is not already urinating. Some semi-solid and solid articles of diet (custards, breakfast foods, toast, crackers, bread, etc.) may be allowed. As a rule, no sedative is now necessary, except an occasional dose of sodium bromide when the patient is particularly restless at night. It is well to start the patient on some good iron tonic, for these patients are usually anemic. Tincture of the chloride of iron, with care in giving, is excellent. If preferred, some one of the numerous organic iron preparations may be used. If adhesive strips have been put on at the first dressing, remove them now, so that the skin will be in good condition for the other strips to be put on when the sutures are removed.

The **orders** given at this time may serve as standing orders, to be continued as long as the patient is in the hospital, except when modified for some special indications. They are about as follows:

- Strychnia sulphate, 1-40 gr. in a capsule, three times daily, after meals.
- Tincture ferri chloridi, 10 drops in a capsule, three times daily, after meals.
- Light diet, with extras. Push the nourishment. Give an abundance of water and of liquid nourishment. Articles from the regular diet may be added as desired.
- Urotropin, 5 gr. in half a glass of water, twice daily. Laxative pill (aloin, belladonna, strychnia and cascara) one each night, unless bowel movements are too frequent.
- Give an enema when no bowel movement during day.

Subsequent Orders. It is well to continue the urinary antiseptic for a week after the urine is passed spontaneously. The diet is gradually increased until the patient is taking regular diet with extras. She should continue to take liquid nourishment between meals.

If during convalescence the patient does not take and digest sufficient food, the digestive powers may be increased by massage, salt rubs, passive movements and resisted movements, judiciously administered by a competent nurse. The careful carrying out of the regular nursing given bed patients (including the daily morning bath and evening alcohol rub) is also an important factor in causing the patient to be comfortable and to rest well at night, and to digest her food promptly. If there is any decided digestive disturbance, some remedy for that should of course be given.

Removing the Sutures. Unless there is some indication of irritation in the wound, the dressing is not to be disturbed for ten days. Then it is taken off and the sutures removed. The wound is now healed. The vicinity of the wound is dusted freely with boric acid powder, a smooth piece of gauze (several thicknesses) is laid over the scar (Fig. 718), and the abdomen is strapped with strips of two-inch adhesive plaster (Fig. 729) in such a way as to take the strain from the newly healed wound. Four to six strips are put on (Fig. 730), so as to give firm support. Then a piece of cotton is placed over all and the binder reapplied.

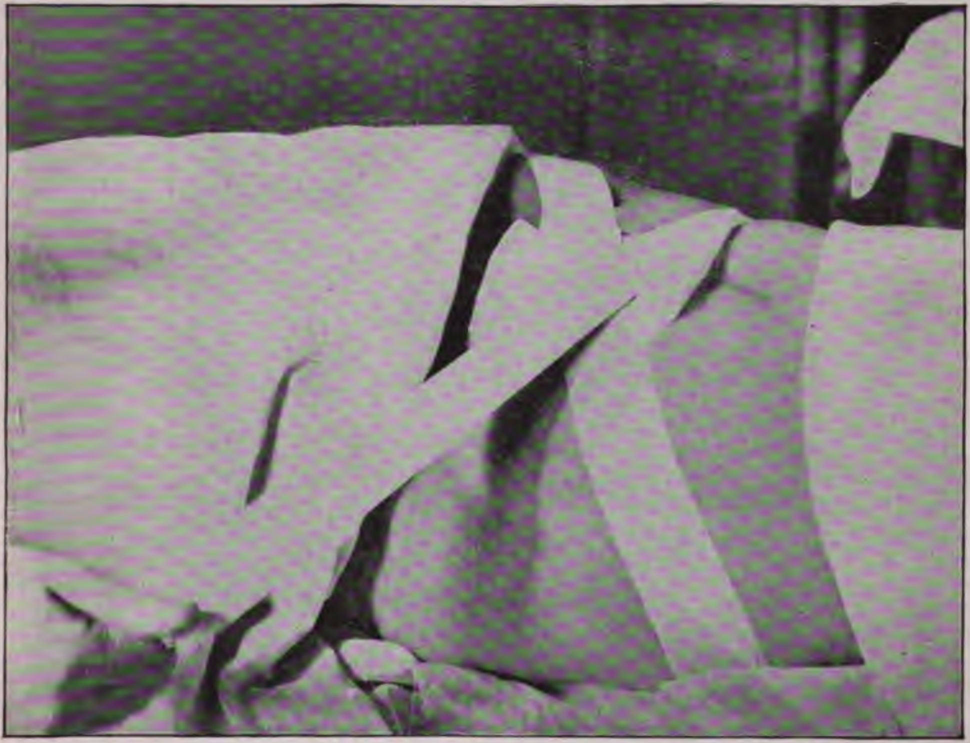

Fig. 729. Strapping the Abdomen after removing the sutures.

The adhesive strips are usually left undisturbed for about a week. If it is desired to look at the wound area, because of irritation along the suture tracts or for other reason, the adhesive plaster is cut along the edges of the gauze (Fig. 730) and the gauze removed so that the scar and vicinity are exposed (Fig. 731). After the required treatment, gauze is again applied and then new plaster put on, the ends of the new plaster adhering to the old plaster at each side. This permits inspection of the wound area as often as desired without the discomfort of repeated removal of plaster from the skin.

Ordinarily, however, the adhesive strips need not be disturbed for a week. In the meantime a strong, light-weight abdominal supporter is fitted to the patient. It is well to leave the adhesive strips on until the patient reaches home, as they serve as an additional protection during the extra exertion of the trip. After the patient reaches home and the abdominal supporter has become comfortably adjusted, the adhesive strips are taken off. The supporter is to be worn for about three months, but only when the patient is up and about. It may be taken off at night. Some authorities recommend that no abdominal supporter or binder be worn. But while most patients get along very well without it, I feel that it is a precaution which it is well to employ. It is of decided benefit in some cases (where the abdominal wall is lax and protuberant); it adds to the patient's comfort in most cases, it reminds the patient of the necessity of avoiding over-exertion in all cases, and it does no harm in any case if waist constriction be avoided.

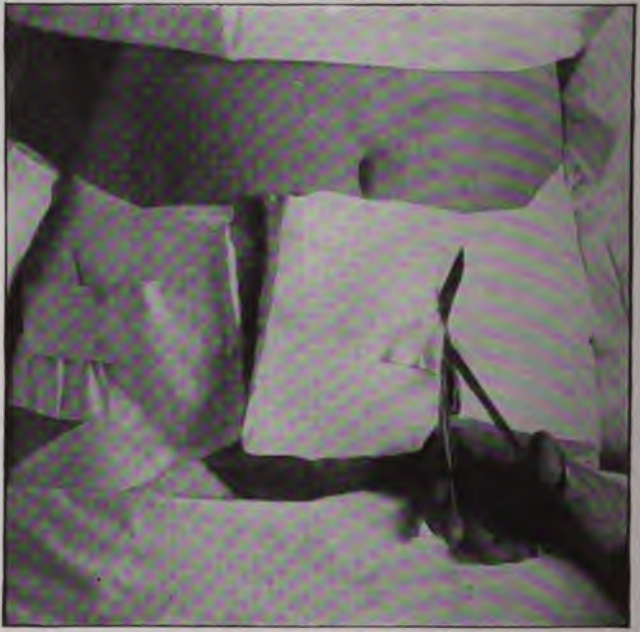

Fig. 730. Cutting the Plaster, so as to inspect the wound and change the gauze without removing the plaster from the skin.

Sitting Up, Walking. Unless there is some special reason for hurrying the patient to the sitting posture, she should be allowed to remain quiet and in the recumbent posture for the first few days. After the bowels have moved well, I encourage the patient to move about in the bed and to be propped up as much as she likes—more and more each day—so that by the end of the first week she is ready to sit out of bed and begin walking. The advantages of this early moving about in the bed and early getting up are better circulation (less "bed-weakness"), and consequently better repair of wounds, better digestion and quicker restoration to normal condition.

It is not advisable, however, to get the patient up too early, while nature is still fully occupied with the acute repair work of the first few days. The feeling of the patient is, as a rule, the best guide as to when to begin activity. I am convinced that the plan just described is decidedly preferable to the "hurry up" method of getting the patient out of bed in one or two days, which was recently so popular with some. In cases where I think the patient will be benefited by further rest, I do not hesitate to keep her in bed ten days or two weeks, or even longer. In many instances the patient is greatly debilitated and literally "worn out" by chronic sepsis or by months of suffering and ill-health, or by heroic work for her children in spite of failing strength. In all these cases the enforced rest in bed may be an important aid in restoring the patient's health.

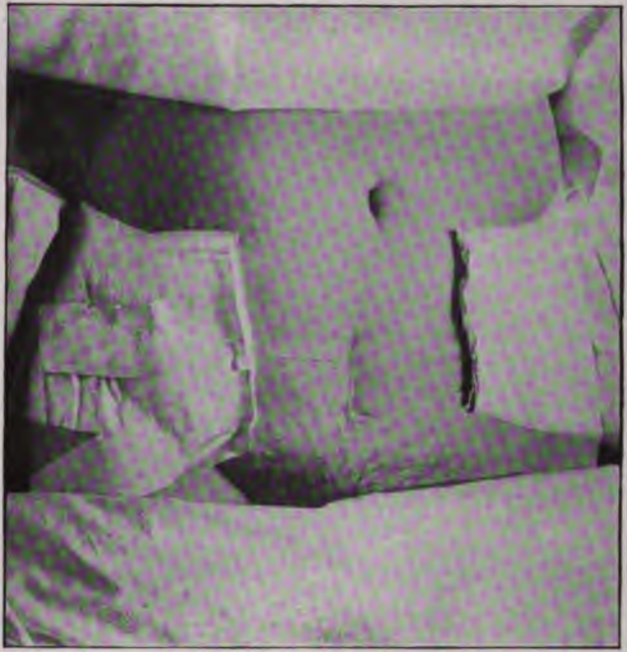

Fig. 731. Method of Exposing the Wound as often as necessary for change of dressing, without causing the patient the discomfort of repeated removal of plaster from the skin. The new plaster is put over the old.

After the patient has returned to her home, the tonic medicines and regimen should be kept up for three to six months, as necessary, to put the patient in first-class general health.

(B.) SPECIAL CONDITIONS.

1. Drainage Cases. When a **glass tube** is left extending into the pelvis for drainage, a large piece of sterile sheet-rubber is usually slipped over the end of the tube (Fig. 732), to keep the fluid that comes out of the tube from soiling the gauze on the abdominal wound. A small wick of twisted gauze (Fig. 733) is then passed to the bottom of the wound to aid in the drainage. This twisted wick should be small enough to leave plenty of room around it inside the tube to permit the discharge to come out. Some pieces

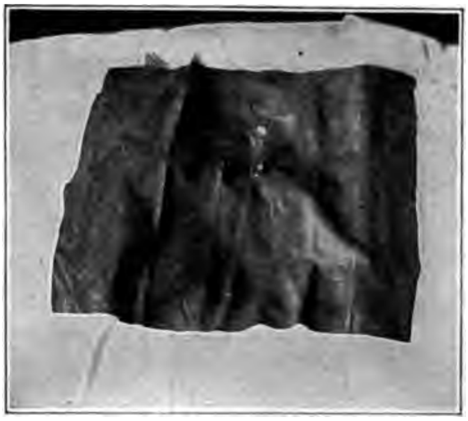

Fig. 732. Dressing the Drainage Tube. The piece of sheet-rubber punctured and slipped over the end of the tube.

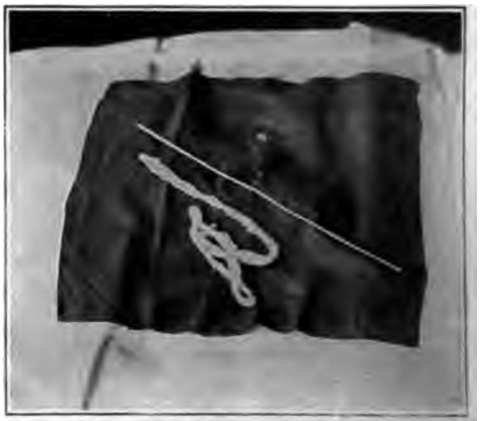

Fig. 733. Dressing the Drainage Tube. The gauze wick and applicator for emptying the tube. After the tube is emptied, a gauze wick is left in it to assist drainage.

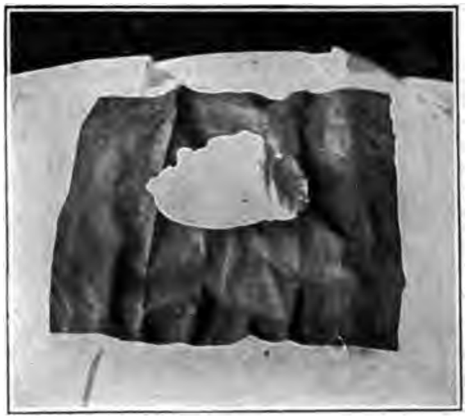

Fig. 734. Dressing the Drainage Tube. Gauze pieces arranged about the end of the tube, to absorb the discharge.

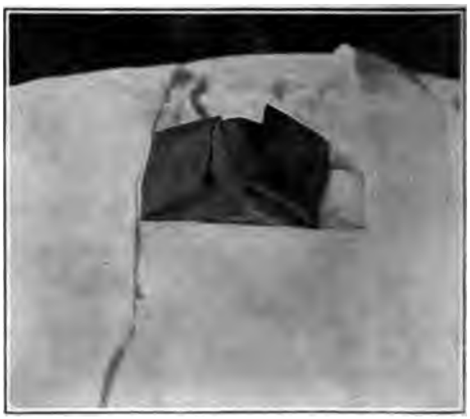

Fig. 735. Dressing the Drainage Tube. The sheet-rubber folded over, to inclose the gauze about the end of the tube and thus protect the general dressing.

of gauze are now placed over the end of the tube (Fig. 734) and the piece of sheet-rubber is folded over the gauze from all sides (Fig. 735). The whole is then covered with a large piece of sterile cotton and the binder applied, taking care to avoid pressing on the tube. This is the technique ordinarily employed in the dressing at the time of the operation.

The frequency with which the drainage tube must be dressed varies with the amount of drainage fluid. In chronic cases, where the pelvis is left fairly dry, the amount of fluid is usually small. It is well to dress the tube within three to six hours, or before if there is a probability of much oozing or secretion. The frequency of the subsequent dressing is regulated by the amount of fluid found. The idea is to change the dressing before all the gauze confined in the rubber-dam becomes filled with absorbed fluid. Usually every eight to twelve hours is sufficient for the first two days and after that once daily.

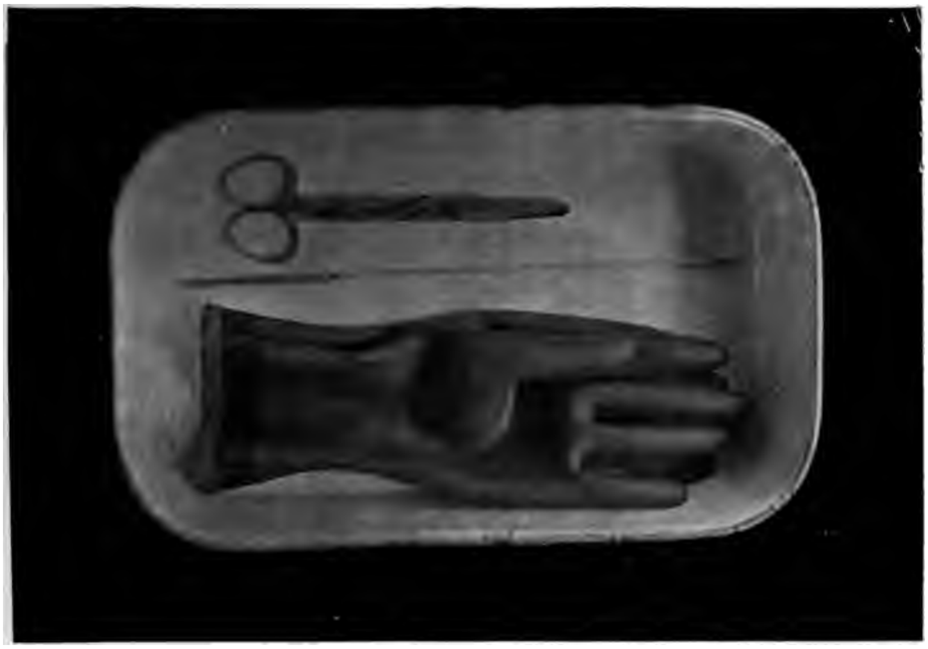

Fig. 736. Dressing the Drainage Tube. Articles required—applicator, scissors and pair of rubber gloves.

In cleansing and dressing the tube the strictest asepsis must be observed. The instruments needed are simply a long probe or applicator, for pushing the gauze wick to the bottom of the tube, and a scissors for cutting the gauze. These instruments should be boiled, and in addition to the ordinary disinfection of the hands it is well to wear sterilized rubber gloves (Fig. 736). After the preparation of the instruments and of the physician's hands, the binder and outer part of the dressing is removed by the nurse, thus exposing the sterile sheet-rubber. The physician then unfolds the sheet-rubber and removes the gauze therein and also the saturated gauze wick in the tube. Another gauze wick is then twisted, taking care to remove all loose ravelings. The end of this sterile wick is then pushed to the bottom of the tube and left there for a minute to absorb the discharge. It is then removed and a fresh one introduced. This process is repeated until all the fluid in the tube is removed. A fresh wick is then introduced and gauze is placed about the end of the tube, and the sheet-rubber folded over as before. The inner surface of the rubber-sheeting should be cleansed with some reliable antiseptic solution (e. g., bichloride, 1-2000) and the interior of the tube may be cleansed with a gauze-wick wrung out of the same solution. Also, the tube should be raised slightly and rotated once daily, in order to prevent in-

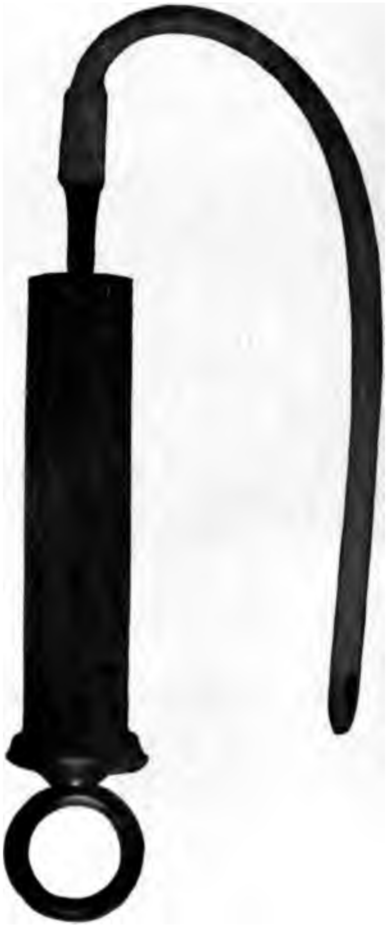

Fig. 737. Syringe and part of a catheter, for removing large amount of fluid from drainage tube.

jurious pressure on the rectum (which might cause perforating ulceration) and to prevent stopping-up of the drainage holes by omentum or bowel, or exudate.

The tube is removed when the collection of fluid in the pelvis ceases—that is, in two to five days. In suppurative cases the secretion of course keeps up indefinitely. In such a case the tube is left in until all acute threatening symptoms have disappeared and until a good wall has formed about the tube tract, shutting it off from the general peritoneal cavity. It may as a rule be removed in four to six days, and a small rubber tube or piece of gauze inserted into the tract to keep the outer end open until it closes from the bottom. The treatment of such a tract is to keep it clean by cleansing (daily or less frequently, as needed) with hydrogen peroxide, keeping the outer end open as mentioned, and protecting it from secondary infection by an antiseptic dressing. It is well to keep some antiseptic drying powder (e. g., boric acid) dusted freely on the wound about the drainage tube.

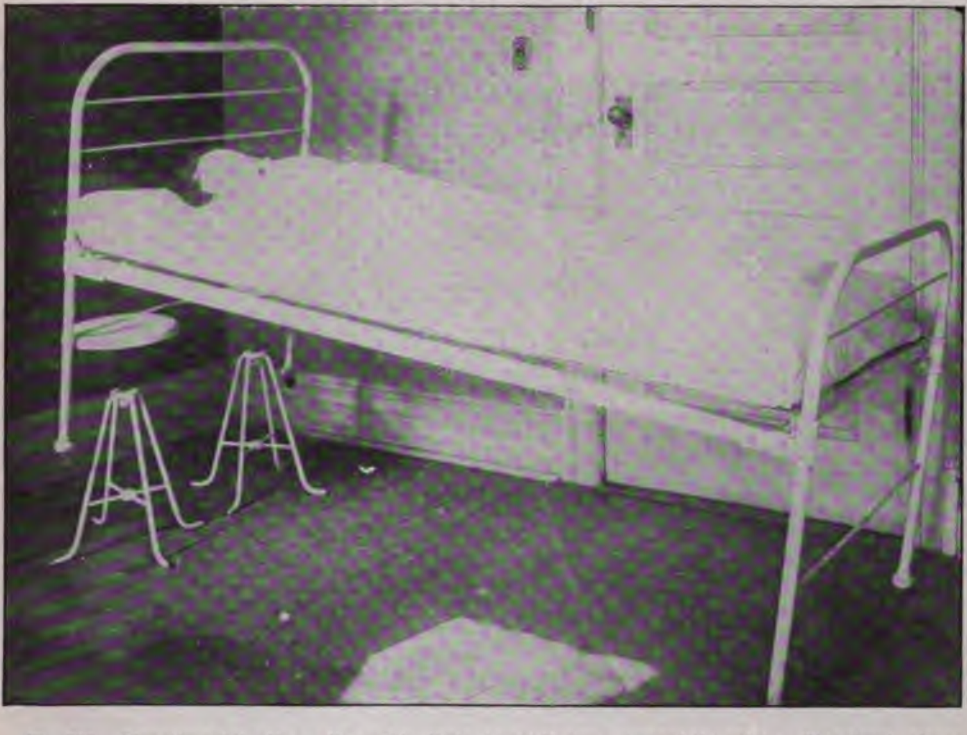

Fig. 738. Elevation of the Upper Part of the Body, to aid Drainage toward the pelvis. This simple elevation of the head of the bed is employed immediately after operation, and in other cases where the patient is too weak to be placed in the "half-sitting" or regular Fowler posture. The head of the bed is raised about twenty-four inches.

In acute cases, where there is virulent infection and free secretion, the tube must be cleansed very frequently—as often as every two or three hours at first. In these cases, where the fluid is abundant, the removal of it from the tube is preferably accomplished with a syringe. A very convenient arrangement for this purpose is the ordinary hard-rubber syringe with a soft-rubber catheter attached. It is more convenient to handle when only two-thirds of a catheter is used, as shown in Fig. 737. In the very acute cases, where drainage in various directions is required and it is necessary to leave the wound partly open, the whole dressing soon becomes soiled with the discharge and consequently must be changed frequently. In fact, in some of these cases it is advisable to employ warm moist dressings (wrung out of normal saline solution or boric acid solution, 3 per cent) all over the abdomen and wound, the moist dressing to be changed every few hours, or as often as it absorbs a considerable amount of the septic discharge.

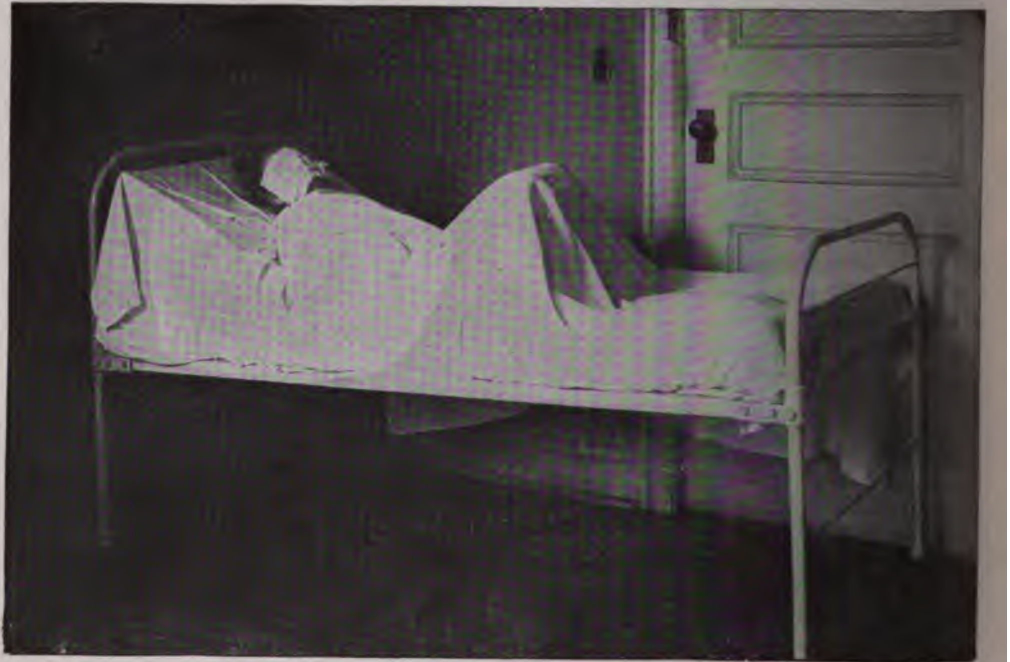

Fig. 739. Elevation of the Upper Part of the Body, to aid Drainage toward the pelvis (Fowler posture).

When **rubber tubing** is used for drainage, it may be used alone or with gauze around the tube or as the "split-tube with gauze." In the latter a piece of large rubber tubing is split longitudinally and a small wick of twisted gauze laid inside, but the gauze wick must be small enough to permit the free escape of fluid through the tube. Rubber-tube drains are left in until the necessity for drainage has disappeared and the drainage tract is largely closed from the bottom. Where the rubber tube is of large size, it is removed after a few days and a smaller size introduced.

When **gauze** is used for drainage, alone or with rubber tubing, it is removed usually in two to four days.

In all drainage cases, except where the patient is in severe shock, the upper part of the body should be raised higher than the pelvis, so as to cause all septic fluid in the peritoneal cavity to gravitate to the pelvis, where it is removed through the drainage tube. Immediately after the operation raise the head of the bed about two feet, as shown in Fig. 738. After the patient has recovered from the anesthetic she may be propped up in the half-sitting posture (Fowler posture), as shown in Fig. 739.

In acute septic cases normal saline solution should be used freely per rectum, as described on page 722.

2. Uterine Replacement Cases. The principal special points in the care of the patient after any operation for fastening the uterus and adnexa forward, is to see that the bladder is not allowed to fill sufficiently to force the uterus backward again in the first few days following operation. If the patient can not urinate, she should be catheterized often enough to prevent injurious distention.

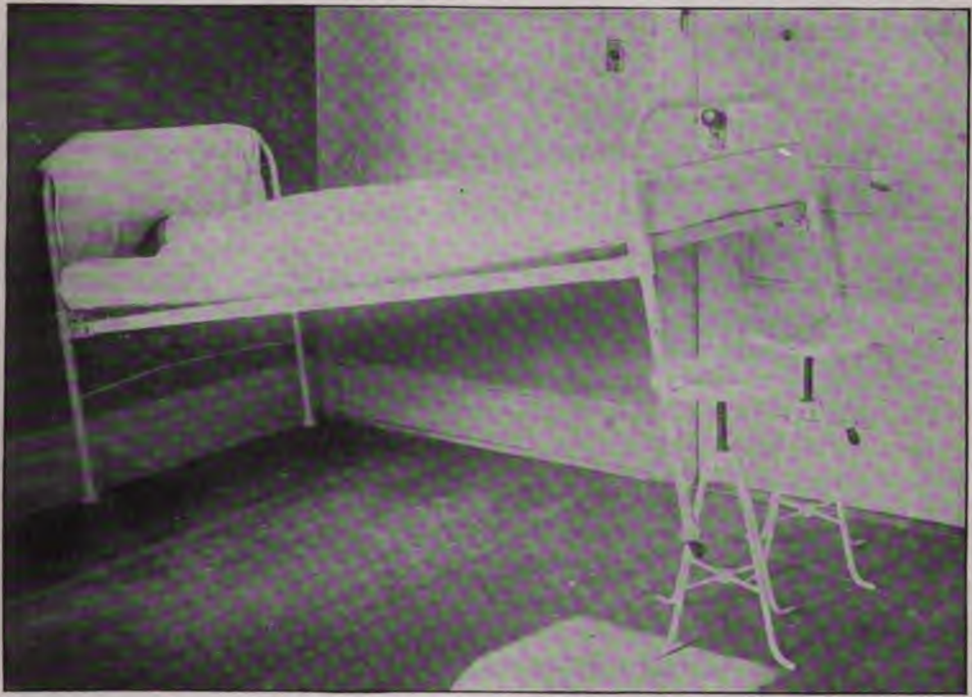

Fig. 740. Elevation of the Lower Part of the Body, for the treatment of Shock. The foot of the bed is raised about twenty-four inches.

3. Severe Shock. When the patient is in severe shock, the head should be lowered by the elevation of the foot of the bed about two feet, as shown in Fig. 740, except in those cases where there is danger of spreading pus from the pelvis to the upper part of the uncontaminated peritoneal cavity.

Give the patient digitalin 1-50 gr. every two hours and strychnia sulphate 1-40 gr. every four hours until reaction comes on. Still more important is the free use of normal saline solution by proctoclysis. If the shock is extreme, saline solution may be given also subcutaneously, one or two pints under the skin of the chest on one or both sides. If a very large quantity of blood has been lost and the pulse is thready and almost gone, a pint to a pint and a half of saline solution may be given intravenously. The use of oxygen is an additional measure of value in cases where respiration is defective.

The hot water bottles must be renewed as necessary to keep the patient warm, and the proctoclysis and other treatment should be given in such a way as to avoid chilling of the surface.

4. Internal Hemorrhage. A serious internal hemorrhage is indicated by rapid weakening of the pulse, an increase of pain in the abdomen and subnormal temperature. It is rare after the first twelve hours, and usually comes within the first six hours. If there is a drain through the abdominal incision or into the vagina, there will be a free flow of bloody serum, or, if it is a tube drain, of blood itself.

The treatment of a slight hemorrhage is (a) to elevate the pelvis by raising the foot of the bed (Fig. 740), (b) to put an ice-bag on the pelvis outside the dressing, (c) to keep the patient perfectly quiet on her back, and (d) to give a sedative (codeine) if necessary to secure rest. Discontinue the normal saline enemata, as the pelvic disturbance occasioned thereby may increase the hemorrhage or start it after it had once ceased. Do not give any stimulants or employ any measure that will increase the blood pressure. The hope is that, as the blood-pressure is low, the bleeding will cease for a few hours—long enough to permit effective clotting to take place in the oozing area. In twenty-four hours such clots become so firm that a renewal of the bleeding is not probable.

When the hemorrhage is severe, the abdomen should be promptly reopened (if the patient is seen in time) and the bleeding vessel caught.

5. Persistent Vomiting. To make the nausea and vomiting as slight as possible, the patient's head should be low (no pillow) for several hours after anesthesia. For the first day the patient should be kept perfectly quiet, with the eyes closed most of the time, so as to nap as much as possible. The nausea is increased by talking or by even looking about. If a visitor is allowed, it should be for only a few minutes and there should be but little talking. When water is begun, it is preferable usually to give hot water, in tablespoonful doses and frequently, though some patients retain cold water very well from the first. When the nausea and vomiting is such that the patient can not rest, give codeine phosphate, ½ to ¾ gr. hypodermically, and repeat after three hours, as necessary to give rest.

The most effective measure for overcoming vomiting, persistent nausea, and stomach distress generally is washing out of the stomach with normal saline solution, as described on page 720. After the bowels are well opened the vomiting usually ceases unless there is some serious complication, such as beginning peritonitis or intestinal obstruction, both of which are mentioned later.

6. Acute Dilatation of Stomach. This is a serious complication that may develop any time after operation, but especially within the first sixty hours. The patient complains of persistent pain in the epigastric region, and this region becomes more or less distended. The pulse becomes rapid and weak without apparent cause. There is usually nausea and vomiting, but the most constant and characteristic signs are the persistent epigastric pain and the failing pulse. The anatomical change is over-distention of the stomach with gas, due to different causes in different cases. In the majority of cases it is probably due to some displacement of the stomach, with kinking and obstruction at the pylorus. As the gas can not escape, its continued accumulation becomes a serious matter, and in several instances death has resulted from over-distention of the stomach caused thereby.

The treatment for this condition is prompt introduction of the stomach tube, to permit the gas to escape, and irrigation of the stomach with normal saline solution to remove all decomposing material and prevent reaccumulation of the gas. This complication should be watched for and recognized, and the stomach tube used before it reaches a serious stage. If the trouble recurs, several stomach-washings may be required. It is well also to vary the patient's position, so as to overcome displacement of the stomach and dragging on its supports. In some cases it has been thought that the Fowler posture was a factor in the development of this condition.

7. Kidney Insufficiency. This is easier prevented than treated after it once develops. The preventive measure is to make sure that the kidneys are doing their work well before operation. The treatment for kidney insufficiency after operation consists in the free administration of normal saline solution by proctoclysis, in elimination by means of free bowel-movements, and sweat packs and such other measures as are used for the regular treatment of uremia. In urgent cases the normal saline solution may be given subcutaneously or even intravenously.

8. Constipation and Intestinal Paralysis. When the purgative measures given under the regular after-treatment (page 950) fail to cause bowel movement, the loss of function may be due simply to temporary paralysis of the bowel or to intestinal obstruction, or to beginning peritonitis. Unless there are decided evidences of intestinal obstruction or peritonitis, it is to be assumed that the trouble is temporary intestinal paralysis, and treatment for the same is begun. The treatment consists in giving strychnia, in giving repeated doses of purgatives, such as compound cathartic pills or magnesium sulphate by mouth, and in administering enemata that tend to stimulate the bowels to action. A tablespoonful of turpentine may be added to the magnesium-sulphate enema already mentioned. Or the patient may be given a high enema of half an ounce each of ox-gall and turpentine in a pint of water, to be retained as long as possible. Eserin salicylate has seemed to assist in stimulating intestinal peristalsis in some cases—1-80 gr. hypod., and repeat after four hours if no effect.

9. **Intestinal Obstruction.** This is indicated by the combination of persistent vomiting, absence of bowel movement in spite of the use of the purgative measures already mentioned, severe cramp-like pains in the abdomen recurring every few minutes, a serious rise in the pulse rate, and the absence of fever, such as would be caused by peritonitis of sufficient severity to give rise to the other symptoms. Later there is fecal vomiting. Such a combination of symptoms calls for immediate reopening of the abdomen, and relief of the obstruction. Unless this is carried out promptly, there will develop a peritonitis which, in combination with the obstructive trouble, is very likely to prove fatal in spite of later operation.

10. **Peritonitis.** This is indicated by the combination of symptoms consisting of fever (beginning or increasing after the second day), persistent vomiting (extending into the fourth and fifth days), serious increase in the pulse rate, steady pain in the abdomen (without the cramp-like pains of intestinal obstruction), and an increasing tenderness in the lower abdomen, which gradually spreads to the upper abdomen. The intestinal tract is usually sluggish (partial intestinal paralysis), but there is not the complete absence of bowel movement, such as is seen in intestinal obstruction.

A rise of temperature within the first twenty-four hours after operation is not of serious significance. Not infrequently in extensive operations, involving large peritoneal or connective-tissue surfaces, there is a sharp rise of temperature (up to 102° or 103°), coming on within twenty-four hours and subsiding the second or third day without further disturbance. In the absence of a more definite explanation, this "aseptic rise of temperature" is said to be due to the "absorption of blood-ferment." But when there is a rising temperature after the second day, it is indicative of some unusual disturbance, and when the combination of symptoms above mentioned is present the diagnosis of peritonitis is clear.

The treatment of peritonitis following operation is the same as for peritonitis without operation. This has already been described under Acute Pelvic Inflammation (page 717).

11. **Local Suppuration.** This is indicated by fever, coming on after the sixth day, and a moderate increase in the pulse rate and localized pain. If the suppuration is deep in the pelvis, the patient complains of deep-seated pain and usually of backache or of pain extending down one thigh. If the inflammatory focus is situated in the back part of the pelvis, bowel movement or the giving or an enema causes pain. Vaginal examination shows a boggy mass, which is very tender. The treatment for such local inflammation deep in the pelvis is to secure good bowel movement, to make the patient comfortable, to increase tissue resistance, and to await resolution or abscess formation. When fluctuation can be detected by vaginal examination, open and drain the abscess per vaginam. Exceptionally, it may be advisable to open into a solid mass (inflammatory focus without fluctuation) or to open into the cul-de-sac for general pelvic drainage.

When the suppuration is in the abdominal incision, there is increasing pain along the course of the incision. This calls for removal of the dressing and inspection of the wound. Inflammation there is indicated by the cardinal signs (pain, heat, redness and swelling), localized at some part of the incision, or extending all along it. If the disturbance is slight, a hot moist antiseptic dressing, changed every twenty-four hours, may be sufficient. If there is a pronounced cellulitis at some point, that portion of the wound should be opened superficially and a gauze or tube drain put in and the hot moist dressing applied. If drainage of the infected area can be satisfactorily effected without removing the tension sutures, that is preferable. In some instances the inflammation is confined to the subcutaneous tissue and no disturbance of the deep buried sutures is necessary. The important point, however, is to secure free drainage of the infected area and prevent serious absorption. If the whole wound is infected, it must all be drained. In such a case the whole wound (except the peritoneum) is likely to open. As soon as serious absorption has ceased, the sides of the wound are brought together by strapping with adhesive strips, the wound being exposed and cleansed every day or two (depending on the amount of discharge) with hydrogen peroxide. Later, if thought preferable, the granulating surfaces may be freshened by curetting and then brought together by sutures, with the idea of securing secondary union.

12. Phlebitis. This seldom occurs now, since patients are gotten out of bed early. When it does appear, it is usually in about the third week, when the patient has passed the time for the ordinary operative complications and is congratulating herself that she will soon be entirely well.

She complains of pain in the groin and upper part of the thigh on one side, and the temperature gradually rises to 102° or 103°. There may or may not be swelling of the foot and leg, but there is always tenderness on pressure over the femoral vessels just below Poupart's ligament. This tenderness may, in some cases, be traced a considerable distance down the thigh, and also up along the iliac vessels.

The treatment of phlebitis is immediate bandaging of the leg and thigh (from toes up), elevation of the leg in a comfortable position on pillows, and the maintenance of this position and of the dorsal posture for several days. In mild cases the measures mentioned usually relieve the spontaneous pain, but in the severe cases sedatives may be necessary for a time to give rest.

It will be necessary to maintain this position most of the time for a week or more, depending on the severity of the trouble and the rapidity of the improvement. When the above treatment is carried out promptly and persistently, serious trouble seldom results. If the patient is permitted to use the leg, the suffering is increased and the disability prolonged, and there is danger of serious embolism by particles detached from the thrombosed area in the vein and carried to the brain or heart or lungs. On account of the danger of detaching emboli, no massage or rubbing of the involved area is permissible until sometime after all acute symptoms have subsided.

Getting patients out of bed early (at the end of a week) has almost eliminated this complication. I have not had a case now for two years, while under the old regimen of keeping the patients in bed three weeks it was rather frequent, occurring in about two per cent. of the abdominal operative cases

13. Pain During Convalescence. Aside from the conditions already mentioned and the natural soreness of the recently disturbed structures, pain during convalescence is usually due to gastric or intestinal indigestion, with gas formation and resulting painful intestinal peristalsis. The treatment for this condition is to remove the irritating material from the intestinal tract by an enema and laxatives, and, if necessary, administer some remedy for the gastric or intestinal indigestion. Of course, operated patients are subject to neuralgic and neurasthenic pains the same as other individuals, and these are likely to be more pronounced at the menstrual time.

An abdominal operation often causes the menstrual flow to appear ahead of time. Not infrequently there is also a slight bloody flow from the uterus, without any relation to menstruation, within a few days after the operation. Such need occasion no alarm, as it disappears in a short time.

14. Subsequent Disturbances. As the patient begins to walk about, there may be more or less **soreness** in the pelvis for some time, until the hyperemia of the healing tissues has disappeared and the new connective tissue is firm.

In drainage cases a **sinus** sometimes persists. The persistence of such a sinus may be due to sloughing tissue or to a ligature. In the case of a catgut ligature or sloughing tissue, the troublesome material will usually disintegrate and come away in the course of some weeks. The sinus-track, in the meantime, should be kept clean by frequent cleansing with hydrogen peroxide—every day or two, depending on the amount of discharge. The patient can care for the fistula at home after being shown how to apply the peroxide and the dressing.

If a silk ligature is at the bottom of the sinus, it may come out itself after some weeks or months, or it may have to be taken out. Sometimes it may be caught up by "fishing" with a silkworm-gut loop or other contrivance. Otherwise, it must be removed by operation. A rare cause of persistent fistula is a sponge or forceps left in the cavity.

Occasionally a **fistula** connected with the bowel follows abdominal section. Ordinarily such a fistula should be treated by a simple cleansing for some time, for in a considerable portion of the cases it will heal spontaneously within a few weeks. If it persists indefinitely, it requires operative treatment. Such an operation should not be undertaken lightly, for it may prove very difficult and dangerous.

A **hernia** in the scar indicates defective healing of the wound. This is usually due to the necessity for drainage, which prevents perfect approximation of the sides of the wound. If the hernia is small, it may in some cases be held back satisfactorily by an abdominal supporter. If large, or if persistently troublesome even though small, it requires operative treatment.

AFTER-TREATMENT IN VAGINAL OPERATIONS.

The general after-treatment of vaginal operations is practically the same as for abdominal operations.

Gauze extending from the vagina into the peritoneal cavity is removed usually in three or four days. After removing gauze, if there is much of a cavity, it is advisable to replace the gauze in the vaginal incision, to keep it open until the cavity is nearly closed by granulation. In the case of an abscess cavity, a rubber tube, arranged as previously explained (Fig. 637), is preferable. After the gauze is left out of the vagina, a cleansing douche of normal saline solution or an antiseptic solution is given once or twice daily, depending on the amount of discharge.

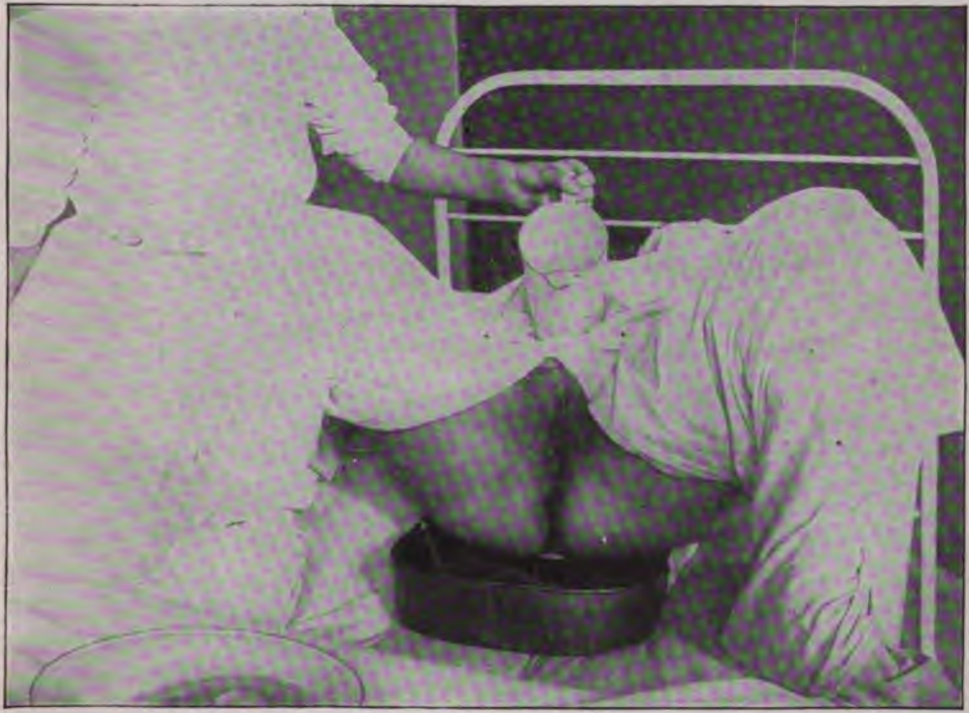

Fig. 741. Cleansing the External Genitals. The use of the "Pitcher-douche."

After a vaginal or perineal operation the vulva and adjacent surfaces must be kept covered with an antiseptic dressing, the same as any other wound region. Here, however, on account of the necessity of evacuation of the bowel and bladder, the problem of wound protection is more complicated. The dressing must be changed several times daily and with each change of dressing there is danger of contamination.

When it is necessary to change the dressing, the nurse should disinfect her hands and then cleanse the operative field with an antiseptic solution (e. g., bichloride 1-5000). The cleansing may be conveniently accomplished by means of the "pitcher douche" (Fig. 741). After the cleansing a fresh dressing is put on and the T-bandage again applied (Fig. 742).

If the patient can pass the urine, she should ordinarily be permitted to do so, whatever the character of the vaginal work. Catheterization is more likely to do harm than urination, especially as the urine remaining on the genitals is at once removed by the cleansing solution. To aid spontaneous urination, patient may be propped up, hot packs on the vulva may be used, and also firm pressure over the bladder as the patient is trying to urinate. Hot douches also aid some, and may be used if there is no contraindicatio

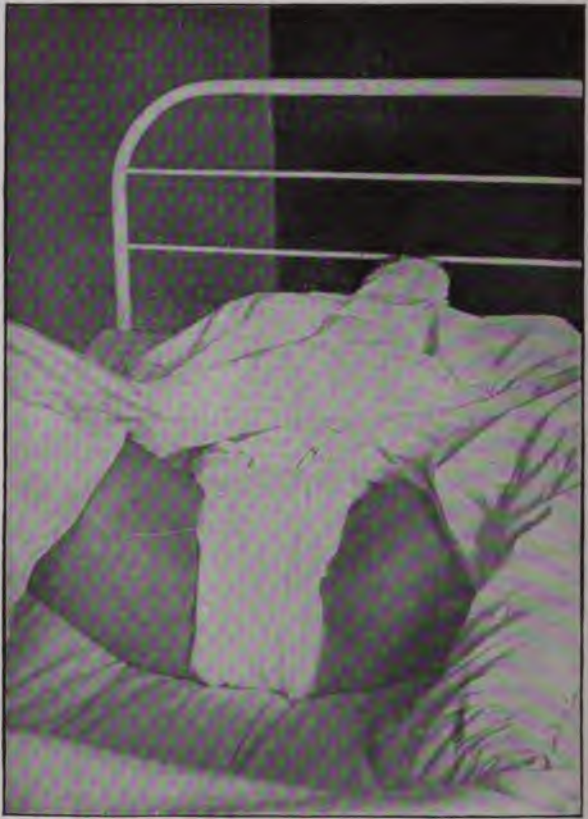

Fig. 742. The Vulvar Dressing Applied. This dressing should be large enough to cover all the adjacent surfaces, including the pubic hairy region, and should be kept spread out by a wide T-bandage.

In many cases, however, the patient cannot urinate at first, and m catheterized for two or three, or more, days. Catheterization must be out under strict antiseptic precautions. The catheter is boiled, the

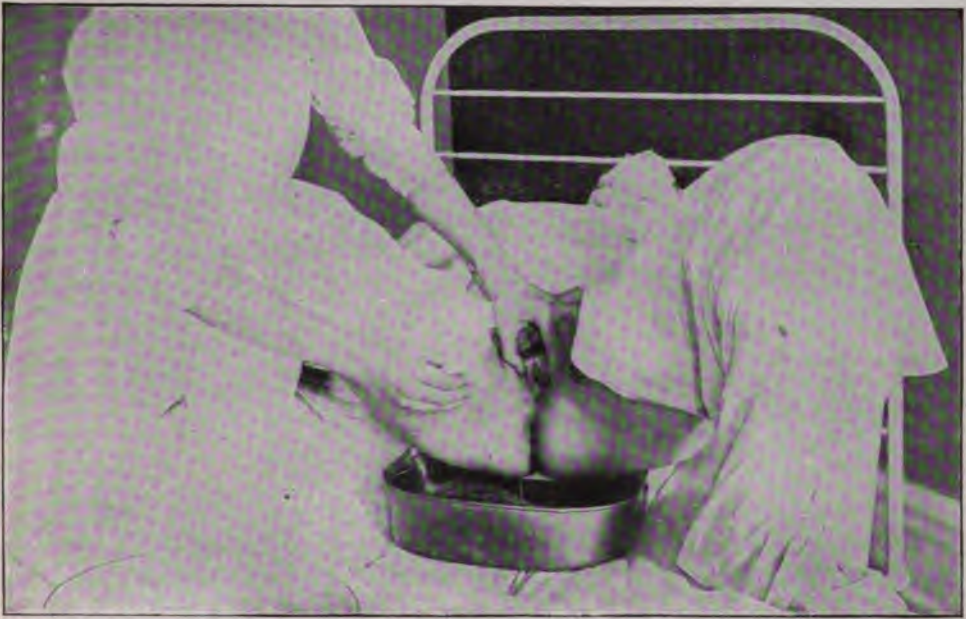

Fig. 743. Catheterization. After the nurse cleanses the vestibule as here indicated, the labia must be kept spread apart until the catheter is introduced. When the labia are allowed to drop back over the meatus after cleansing, the meatus must be again cleansed with the antiseptic solution before the catheter is introduced.

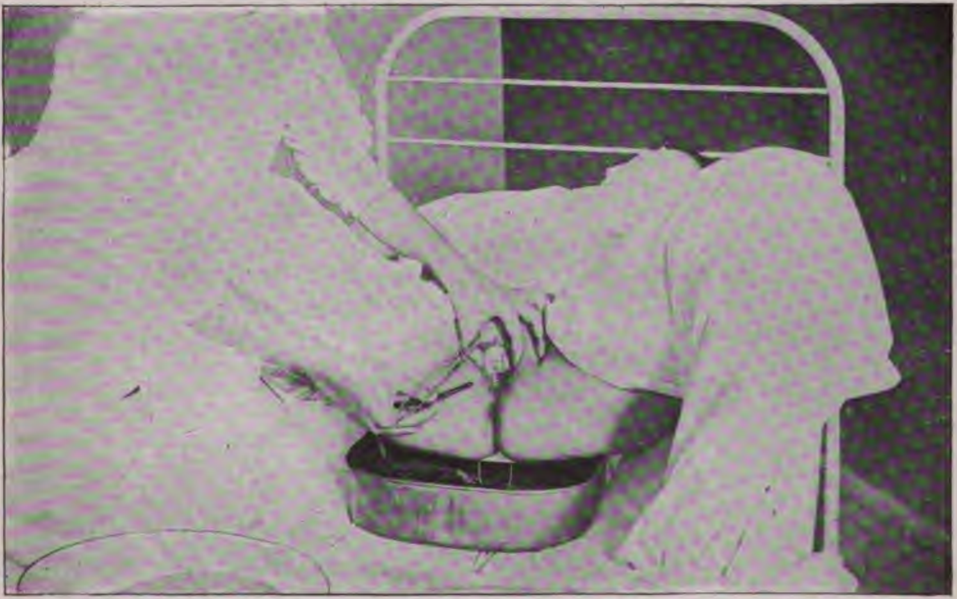

Fig. 744. Catheterization. After the catheter is boiled, do not touch the point with the fingers. The catheter is grasped well back from the point, as here shown, and the point is introduced into the urethra without touching the labia or the fingers. A glass catheter or a soft rubber catheter may be used, as preferred.

hands are disinfected, and the vestibule and meatus of the patient are carefully cleansed with an antiseptic solution. After the labia are once separated and the vestibule cleansed, the labia must be kept separated, so that there is no recontamination of the vicinity of the meatus, until the catheter is introduced (Figs. 743, 744). Care should be taken to avoid touching the part of the catheter which enters the bladder. The catheter should be grasped well back from the point, as shown in Fig. 744. In order to prevent cystitis, it is well to give the patient some reliable internal urinary antiseptic while she has to be catheterized and for several days after the urine is passed spontaneously. An additional precaution is to have the bladder irrigated with 3 per cent. boric acid solution once or twice daily while catheterization is necessary.

For the **After-treatment of Pelvic Abscess,** see page 713.

For the **After-treatment of Perineorrhaphy,** see page 493.

For the **After-treatment of Trachelorrhaphy,** see page 556.

For the **After-treatment of Curetment,** see page 582.

The **After-treatment of Extraperitoneal Shortening of Round Ligaments** is practically the same as for Abdominal Section with the special points for Retrodisplacement cases, except that there are two wounds and they are situated laterally and do not require particular support after they are healed.

CHAPTER XVII.

MEDICO-LEGAL POINTS IN GYNECOLOGY.

There are various conditions connected with the genital organs concerning which the physician may be called to testify in court or to give a written opinion.

Such testimony is, generally speaking, simply the recitation of facts in anatomy, physiology, pathology, symptomatology, diagnosis, treatment and prognosis, with which the physician is necessarily more or less familiar because of his daily work. But there are certain things, of little or no value in the ordinary diagnosis and treatment of diseases, which assume much importance when the case comes into court. So, when called to attend a case in which there is any probability of court proceedings, the facts that are of medico-legal importance should be given considerable attention.

I shall point out some of these facts in connection with certain subjects that frequently find their way into court.

RAPE.

Rape is defined as "the unlawful carnal knowledge of a woman without her consent," and again, more in detail, as "sexual intercourse with a woman effected by violence, or with a young girl by abuse of her ignorance."

Medical evidence is ordinarily required to confirm or disprove the statement that rape has taken place. False accusations of rape are very frequent. Taylor states that for one real rape tried in the courts there were, on the average, twelve pretended cases. Some of these cases of false accusation are founded on a mistake, as may happen with infants, children and persons mentally defective. In other cases the accusations are made willfully and designedly for the purpose of extortion or revenge, or from other ulterior motive. In some instances the false accusation may be at once disproved by medical evidence, though it has happened that the medical man has been deceived and duped by designing persons. In many cases in adults the medical evidence is not decisive, and the truth or falsity of the charge must rest almost wholly on the statements of the prosecutrix herself along with the corroborating circumstances.

The question for the physician to decide as far as possible, from his examination, is whether or not sexual intercourse took place, or was attempted, at approximately the time indicated. Subsidiary information may be required—e. g., as to whether there were evidences of violence elsewhere on the body, or as to whether intercourse has ever taken place or has frequently taken place, or as to whether death was caused by the injuries inflicted, or as to whether disease was communicated at the time, and, if so, what is the nature and probable outcome of such disease. On all such points the physician is supposed to be informed, and he is also supposed to keep such record of his cases as will enable him to testify with certainty, some years afterward, concerning his findings in any particular case.

For the consideration of the medical evidence of rape it is convenient to divide the cases into three classes, the first including infants and children, the second including young unmarried women and the third including married women.

There are, however, certain points that should be kept in mind in all cases. When called to examine or treat a person on whom rape is alleged to have been committed, notice and record, as soon as you can conveniently, the following points, for you are likely to be questioned in court concerning them.

1. The precise time at which you were summoned, the exact hour and date of the examination and the place of the examination. It is important in some cases to know whether or not the female, alleged assaulted, took the earliest opportunity to complain. Also, the exact time elapsing between the alleged assault and the examination has an important bearing on the signs found. The place of the examination at a certain time may be important as showing the truth or falsity of some statement of the defense or prosecution regarding the movements of the female shortly after the time of the alleged assault.
2. Marks of violence about the genitals.
3. Marks of violence on the body elsewhere or on the clothing of the complainant.
4. Presence of stains of spermatic fluid or of blood on the clothing. When the character of the stain is not clear, make a microscopic examination of the contaminating material.
5. The existence of disease probably conveyed in the alleged assault (gonorrhoea, syphilis, chancroid).

The evidences of rape will vary with the age of the patient and other circumstances.

It may be stated that, to establish the fact of rape, it is not necessary to prove penetration into the vagina by the male organ. It has been decided that if the evidence shows penetration of the vulva or to the vulvar cleft, that is sufficient—the legal establishment of the crime requiring only the fact of the penetration, the degree of penetration being quite immaterial. Consequently, the hymen is not necessarily ruptured, even in cases where entrance of the male organ into the vagina would be absolutely impossible without such rupture. "Medical men sometimes have fallen into error on this point, considering that, when the hymen was entire, rape could not have been committed, but the statute law says nothing about the rupture of the hymen as a necessary part of the medical evidence; it requires from the medical witness merely proof of vulvar penetration—this may occur and the hymen remain intact."* However, laws differ, and in any case it would be well to look up the wording and interpretation of the law in the state or country where the alleged assault occurred.

Infants and Children.

In the case of infants and children there are usually decided evidences of injury about the genital organs. Of course, such injury does not necessarily exist, but when it does not exist the proof of rape must rest largely on evidence other than medical. Again, where there are evidences of injury about the genitals in a child alleged to have been assaulted, it does not necessarily follow that the injuries are due to rape. The abnormal appearance may be due to some disease or to some accidental injury, or to some injury inflicted by a designing person with the object of deceiving the physician. All these things must be kept in mind. In this as in other situations, the physician's diagnosis of the conditions present and the interpretation of the meaning of those conditions must be founded on incontrovertible physical evidence that will stand attack from all sides.

The evidences of rape will, of course, vary much with the time that elapses after the occurrence before the child is seen.

1. If the child is **seen within a few hours,** the following conditions may be present:

a. More or less abrasion of the vulva and vaginal opening, with probably some bleeding or clots. If penetration into the vagina has taken place, there may be extensive injuries—tearing of the hymen, perineum, and vaginal walls into the rectum or even into the peritoneal cavity (Figs. 236. 237).

b. Evidences of violence elsewhere on the body or about the clothing—scratches or bruises on the body, tears of clothing, or blood on same or disarrangement of same. In some cases the child has been rendered insensible by a blow on the head or by some drug administered.

c. Presence of semen in the vicinity of the genitals of the child or on the clothing. The contaminating material should be submitted to microscopic examination, that the presence or absence of spermatozoa (as a positive evidence of semen) may be determined.

d. Presence of gonorrhoeal pus on the genitals. The presence of pus about the genitals of the child does not necessarily indicate rape. The pus may have been put there, with blood and scratches, for purposes of deception. If microscopic examination of the pus shows gonococci, it has come, directly or indirectly, from gonorrhoeal inflammation in a male of female. Gonorrhoeal ophthalmia is a not infrequent form of gonorrhoeal inflammation, and the pus from such a condition in the mother or attendant may be responsible for the gonorrheal vulvitis in the child.

2. If the child is **seen after a few days** or a week or so, the following conditions may be found:

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* Taylor's Medical Jurisprudence: American edition by Clark Bell.

a. Acute inflammation, apparently due to violence. The fact that inflammation is present is established by the presence of a mucopurulent discharge, yellowish in color and staining the linen. This may not be present the first day or two, but after that it is ordinarily present if there has been much injury of the vulva or vagina. The inflammation is further indicated by the redness of the parts, the tenderness and the pain on urination.

The acuteness or recent onset of the inflammation is shown by the severity of the process compared with its extent, the marked painfulness of the affected areas, the presence of recent abrasions and tears about the hymen and vulva, and possibly swelling from edema. The parts may be so painful that the child strongly resists any attempt to make an examination—even the separation of the thighs. This is of no diagnostic significance, as children with inflammation from other causes, or even with no inflammation, may do the same. If this obstacle to examination is extreme, it may be necessary to anesthetize the child in order to make the examination. If extensive inflammation is present, there may be fever, and in the very extreme injuries the most serious acute symptoms may develop. Several deaths from this cause, with consequent convictions for murder, have been recorded.

The fact that the inflammation was immediately preceded by violence or mechanical injury is shown by the evidences of recent tears or abrasions, or by ecchymoses due to bruises from some cause, and also by the extent and severity of the inflammation in such a short time and without other apparent cause. Gangrene with sloughing of the external genitals and vagina and adjacent tissues has occurred from these causes, usually with fatal effect, though some have recovered after considerable sloughing.

Care should be taken to exclude similarly appearing conditions due to other causes. The very severe inflammation of the genitals called "noma" has more than once led to a mistaken supposition of rape. It is seen principally in debilitated children with severe acute diseases, such as scarlet fever, diphtheria, typhoid fever, etc. Occasionally, however, it occurs in apparently healthy children where the genitals are neglected and dirty, permitting some severe infection. It may follow marked bruising or injuries of the parts from any cause. It may follow even a comparatively slight injury in an otherwise healthy child. Taylor relates a rapidly fatal case in a child 5 years old who accidentally fell on some thorns, from which she sustained slight injuries, followed by a severe infection and noma and death. The condition of the parts, with the evidence of mechanical injury, were such that it might easily have led to a charge of rape, had the real cause not been known.

b. Gonorrhoeal inflammation in the acute state. Gonorrhoeal inflammation is likely to extend into the urethra, though the vagina may escape. The diagnosis of gonorrhoeal inflammation is established by finding gonococci in the discharge. The significance of the presence of acute gonorrhoeal inflammation depends on circumstances, as already explained.

c. Evidences of chancroidal infection (page 421).

d. There may be present some of the other conditions mentioned under the earlier examination.

The disturbance of the parts may be very slight, as shown in cases where other circumstances proved the rape. For example, an adult was convicted of rape on an infant only seven months old. According to the medical evidence the vulva was somewhat swollen, there was slight excoriation about the labia minora and a small amount of blood. The hymen was not lacerated, and there was no evidence of penetration past it. Seminal fluid was found on the person of the child.

The evidences of rape, when not severe, may very quickly disappear. Casper relates a case of a girl of 8 years upon whom rape was committed by a man in a drunken condition. The girl was examined the next day. The labia were then reddened, and there was congestion about the vaginal entrance, which was very tender. Examination ten days later showed the genitals to be in their natural state, and there was nothing at that time to indicate that the girl had been subjected to violence.

3. An examination **after some weeks or months** may show no evidence of the disturbance, or may show one or more of the following conditions:

a. Chronic muco-purulent discharge from the vulva or vagina. This is present in many infants and young girls from simple causes, such as want of cleanliness, scalding from frequent irritating bowel movements, seat worms, irritating urine, adherent prepuce over clitoris, skin diseases of the vulva, pediculi and various other sources of irritation about the genitals.

b. Chronic gonorrhoeal discharge from the external genitals or vagina. The fact that the discharge is gonorrhoeal is established by finding gonococci. If the beginning of this discharge can be fixed as about the time of the alleged assault, it is strong corroborative proof. Gonorrhoeal vulvitis and vaginitis occur, however, not infrequently from wholly different causes. as previously stated.

c. Evidences of syphilis or chancroid.

d. Laceration or destruction of hymen. The presence of the intact hymen does not preclude rape, as previously explained, neither does the absence of the hymen or apparent laceration of the hymen necessarily imply injury of the membrane by rape or otherwise, though the condition of the hymen might be strong corroborative proof in a particular case, especially if it could be established by the mother or the nurse, or a physician who had made an inspection, that there was, prior to the time of the alleged assault, a well-formed and apparently intact hymen. The hymen is very different in shape and appearance in different individuals (Fig. 209). Occasionally it is practically absent in a child otherwise normal.

e. Abnormal size of vagina, as though it had been at one time dilated. Permanent marked dilation is not very likely to follow a single distention by coitus or otherwise. This condition, which is found occasionally in older girls where the question arises, is due usually to repeated distention of the vagina, by coitus or otherwise, extending over a considerable period of time. In such cases the parts may soften and relax to a remarkable extent, even leading to the suspicion that child-birth may have taken place.

f. Scars from injury of the genitals. The genitals are exceptionally well protected, and are not often injured, except by some disease process or in attempts at coitus. Occasionally a child will fall astride of some object and inflict an injury. Again, injury may come from attempts of the child to introduce some foreign body into the vagina, though such injuries are more likely to be found in girls somewhat older. Scars about the genitals may, of course, result from any severe inflammation or destructive process, and also from chronic inflammation of milder grade when it is accompanied by persistent scratching, with resulting ulceration.

Older Girls and Unmarried Women.

In this class the severity and certainty of the signs decrease and the difficulties of arriving at a definite conclusion increase. The mechanical injuries following coitus, or attempted coitus, are less marked and sooner disappear, and there remain fewer deviations from the normal. Again, in the case of older girls and adult women the medical man is likely to be subjected to two lines of questioning—(A) as to whether or not coitus or attempted coitus took place at about the time of the alleged assault, and (B) whether or not coitus has ever taken place before, and, if so, whether several times or over a considerable period.

A. Evidences of Recent Coitus or attempted coitus. The evidences found will, of course, depend to a considerable extent on the period of time which intervenes between the assault and the examination. If the examination is made within a few hours after the assault, one or more of the conditions mentioned on page 971 may be found. The mechanical injury to the genitals is likely to be less because the parts are larger, and the epidermis less delicate and less easily abraded. The evidence of injury on other parts of the body are likely to be more marked because of the greater resistance which the victim is able to make.

If the examination is made after a few days or a week, the additional points mentioned on page 972 must be investigated. As the local injuries are less than in younger females, they will subside more quickly.

If the examination is made after several weeks or months, the problem for the physician resolves itself into determining whether or not sexual intercourse has ever taken place. The determination of the time when the coitus took place is ordinarily impossible after several weeks have elapsed. In certain cases the medical testimony may be strongly corroborative of other testimony in establishing the time of the assault, even after several months. For example, if it should be established by other testimony (a) that up to the time of the assault the young woman was perfectly well and had never had coitus, and (b) that immediately afterward she had a discharge and had been sick more or less ever since, and (c) that there had been no subsequent coitus—then the finding of a chronic pyosalpinx with chronic endometritis. in an examination some months later, would be strong corroborative proof that the infecting coitus took place about the time of the alleged assault.

Ordinarily, however, after a few weeks all the acute and subacute evidences have subsided, leaving only those that, so far as any distinctive characteristics are concerned, might have been there some months or some years. So the question here is essentially whether or not coitus has ever taken place in the case of the individual concerned.

B. Evidences of Remote Coitus. Ordinarily, it is easy to tell, by a comparatively superficial examination, whether or not a girl or woman has probably had coitus. The differences in appearance of the external genitals and vagina when coitus has taken place (especially if it has taken place several times) are usually so marked that the physician has little difficulty in distinguishing them. This is the general rule. There are, however, exceptional cases which present many of the ordinary evidences of coitus when in fact none has taken place. On the other hand, there are persons who present signs which are considered almost pathognomonic of virginity when in fact sexual intercourse has occurred, and not only sexual intercourse, but pregnancy and labor at full term. So, in exceptional cases it may be very difficult to decide certainly whether or not sexual intercourse has occurred, and in such a case it is particularly difficult to legally prove the same, for the anomalies must then be considered.

The evidences of remote coitus or attempted coitus can be summed up as follows:

1. Evidences of **previous child-birth** at or near term.

a. Destruction of the hymen, leaving only irregular tags here and there about the vaginal opening, with scar tissue between. This condition is very strong evidence of childbirth at or near term. It means that there has passed through the vaginal opening some body large enough not only to stretch and lacerate the hymen, but to stretch out the vaginal ring enormously, and to so stretch and compress and bruise the hymen that the subsequent sloughing and scar-contraction has practically destroyed it. There is really no hymen that can be traced as a circular ring of tissue with simply laceration from intercourse. The hymen, as such, is gone, and there remain only irregular projecting particles of tissue (carunculae myrtiformes) here and there to mark the place where the hymen used to be. Of course a large tumor—e. g., a fibroid—delivered through the vagina might do the same. Also, some destructive inflammatory process or serious injury during childhood or later might produce practically the same results, but such conditions are rare and show also other evidences. There are cases of congenital deformity in which the hymen may be present simply as irregular tags of tissue, or it may, as recorded in some cases, be absent altogether. In such cases we would not expect the scar tissue about the vaginal opening nor the marked enlargement of the opening. So the destruction of the hymen as described, when present, is strong presumptive evidence of previous childbirth.

Suppose the hymen is not destroyed—does that prove that no childbirth has taken place? Not necessarily. Occasionally during labor the hymen is simply torn and then the ring beyond it is stretched and torn. After labor the portions may heal in such a way that the hymen appears practically intact. Still rarer cases have been recorded in which the hymen softened and dilated sufficiently to permit the child to pass and then underwent involution to about its former size. Such a hymen is likely to stretch also during coitus instead of tearing. The examination of such a patient would show an "intact hymen," or, as some, laying too much stress on the condition of the hymen, are wont to write, "virgo intacta." The absurdity of such a designation based only on the condition of the hymen is well expressed by Taylor when he remarks, "Such 'virgines intactae' have frequently required the assistance of accoucheurs and have in due time been delivered of children."

b. Evidences of laceration or great stretching of the perineum, vagina and pelvic floor. These evidences are a large vaginal opening, close approach of the opening to the anus (partial destruction of perineal body), scars about the opening or on the perineum, lax vaginal walls and lax pelvic floor. These have about the same significance as the destruction of the hymen above mentioned—that is, their presence is strong evidence of previous childbirth but their absence is not of much legal significance.

c. Laceration of the cervix. The establishment of a distinct laceration of the cervix is very strong evidence of a previous parturition or operation involving division of the cervical wall. There are conditions that simulate a slight laceration, but a deep laceration would hardly be simulated by anything short of some congenital deformity, and in such a case there would be likely to be other deformities. Also, there would be no scar tissue, such as is ordinarily found about a laceration of the cervix.

d. Evidences of previous lactation. It may be possible to press some fluid from the breasts, or the breasts may show the enlarged veins and the white striae (lineae albicantes) of a previous distention.

e. Evidences of a previous distention of the abdominal wall . There may be present the striae (lineae albicantes) indicative of previous stretching of the skin from distention from pregnancy or other causes. When other causes (obesity, tumor, ascites) can be eliminated by the history, such striae indicate previous pregnancy. Also, marked relaxation of the abdominal wall may be due to previous distention by pregnancy.

2. Evidences of **previous abortion.** The evidences are exceedingly uncertain in many cases after a short time. There may be some slight lacerations, with resulting scars, that may be corroborative evidence, especially partial laceration of cervix. Their presence may help some, but their absence is of no particular significance.

3. **Laceration of hymen** and some dilatation and laxity of vaginal opening and vaginal canal. These are the ordinary evidences of coitus and are nearly always present, especially if repeated coitus has taken place. Usually the opening in a virgin hymen is so small that the introduction of one finger is effected with some difficulty and causes pain. Ordinarily, after repeated coitus has taken place, the vaginal opening admits two fingers easily for examination, and without pain, providing the perineal edge of the opening is carefully depressed.

In exceptional cases the hymen may remain intact after coitus, particularly in those cases where the opening is large and a little stretching will accommodate the male organ. Occasionally, however, a hymen with a small opening will remain intact. In such cases the hymen is usually elastic and unusually tough, and consequently it stretches and dilates under a force that would rupture an ordinary hymen. So that, though it may be said that there are many exceptions to the rule that "coitus ruptures the hymen," there are very few cases in which a hymen presenting the normal rupture capacity (of normal size, normally tense and having the normal consistency, elasticity, and strength) does not rupture on first coitus. In doubtful cases, then, the physician should take care to ascertain accurately, not only the presence of the hymen, but also its character.

The apparent laceration of the hymen or even the absence of the hymen, while presumptive evidence of coitus, is not positive evidence of the same. It may be absent wholly or partially from congenital deformity. It may have been destroyed or dilated by disease or injury in infancy, childhood or later life. It may have been lacerated by an operation or an examination. Its apparent laceration is, however, strong corroborative evidence of coitus when taken in connection with the history of the case, and especially when there is reliable testimony establishing that it was formerly intact.

4. Evidences of a disease usually communicated in sexual intercourse, such as gonorrhoea, syphilis, chancroid, pediculosis pubis.

5. Evidences of uterine or tubal **inflammation,** presumably due to infection following labor or abortion, or coitus.

Married Women.

In married women normal sexual intercourse has, of course, already taken place, so that the establishment of the fact of coitus is of no help in establishing rape. The medical evidence, if any is required, must bear upon the question of coitus by some one other than the patient's husband and against her resistance.

The following points should be investigated:

1. Evidences of **injury about the genitals,** indicative of forced and hurried coitus. There may be abrasions, tears, bruises or bleeding.

2. Evidences, elsewhere on the body or clothing, of **injury in resistance.** There may be bruises and scratches, or an excited or hysterical state, such as might be caused by a harrowing experience. The clothing may show tears or blood-stains, or contamination with dirt of the road or disarrangement. Of course none of these evidences of violence establish the crime of rape. They only go to show that something was attempted that excited the woman's resistance. They might have been due to attempted robbery or to a quarrel. Again, they may have been placed there intentionally. The woman may be trying to deceive for the purpose of extorting money or for other reasons.

3, Stains of **spermatic fluid** may be present on the clothing or person of the woman. If there is any suspicious stain, some of the contaminating material should be submitted to microscopic examination, that the presence or absence of spermatoza may be determined. Any discharge in the vagina may also be examined microscopically, but the presence of spermatoza in the vaginal discharge is not of much significance unless it can be established that no coitus with the husband has taken place for three or four days.

4. **Disease** (gonorrhoea, syphilis, chancroïd) not present in the husband.

The Question of Consent.

The question of consent is often the crucial point on the legal side of these cases of alleged rape in adult women, whether married or unmarried. This question is, as a rule, decided largely or wholly by testimony other than medical. In some cases, however, the medical man may be required to give testimony concerning corroborative facts. An adult woman of ordinary health and strength is supposed to make strong resistance. In such a case, if there are no obvious evidences of resistance, the legal assumption is that consent was given and the case is not one of rape. It has been claimed that a strong woman can make effective resistance, and therefore that an accusation of rape by such a woman is an absurdity. "Some medical jurists have argued that a rape can not be perpetrated on an adult woman of good health and vigor, and they have treated all accusations made under these circumstances as false." This view is too extreme, for there are circumstances and conditions that would make effective resistance impossible even by a woman of unusual strength, as when two or more are combined in the attack or when the woman is rendered powerless by terror or by exhaustion from long struggling with her assailant. The physician may be required to state his opinion regarding the possibility or probability that sexual intercourse could take place without the consent of the woman under various circufstances; for example, the following:

1. When a woman is weak from age, sickness or other bodily infirmity. That coitus could be forced under such circumstances is evident.
2. Where there is imbecility or other form of mental irresponsibility. In such a case consent in the legal sense is impossible.
3. When the woman is attacked by several persons or by one person of superior strength. Rape is unquestionably possible under such circumstances.
4. When there is unconsciousness or partial unconsciousness from narcotics or intoxicating liquors. Coitus may take place under such circumstances without the consent, and in some cases even without the knowledge, of the woman. Many young women are ruined in this way in the "wine-rooms" of our cities. This fact is recognized in the law which makes it a crime to give a woman intoxicants with the intention of stupefying her, so that coitus may take place without her consent.
5. When there is unconsciousness or partial unconsciousness from a general anesthetic, such as chloroform or ether or laughing gas. The fact that

rape may, and occasionally has been, committed under these circumstances is sometimes taken advantage of by designing persons to extort blackmail from dentists and others who must, in their work, anesthetize or partially anesthetize patients without a third party present.

Anesthesia or partial anesthesia of a girl or woman without a third party present is hazardous for another reason. The patient, while going under the anesthetic or recovering from the same, may experience certain feelings or hallucinations that cause her to really believe and firmly proclaim that sexual intercourse took place. Many such cases of false accusations, honestly made, are on record. In one instance "a young lady was accompanied to a dentist by her affianced lover, who never left her while the anesthetic was administered and a tooth extracted; yet she could scarcely be convinced subsequently that the dentist had not attempted to ravish her."

6. When there is unconsciousness or partial unconsciousness from hypnotic sleep. Convictions have occurred of undoubted rape under this condition. Also, false accusations may be honestly made from sensations experienced in this condition. This comes under partial or complete anesthesia. Another source of false accusations, honestly made, is mental aberration of various kinds—from well-marked insanity to the various functional nervous disturbances.

7. When there is unconsciousness or partial unconsciousness from fainting, syncope, an epileptic seizure, a fall or a blow.

8. When the woman is temporarily helpless from terror or from an overpowering feeling of horror at her situation.

9. A woman may cease her resistance under threats of death or duress.

FOREIGN BODIES LEFT IN ABDOMEN.

This is a subject the importance of which is frequently not appreciated by the physician until he is involved in a lawsuit concerning the same. Consequently, I think it well to call attention to the subject by detailing some illustrative cases, that the danger may be recognized and avoided.

Lawsuit. Small Gauze Strip Extracted from Abdominal Sinus.—In a case of retroflexion, Wiggin did a vaginal fixation and also removed the left ovary. Suppuration followed presumably from the stump. Later, laparotomy was performed for the removal of the ligatures. This was followed by an abscess in the abdominal wall and a persistent sinus. The patient then went to another institution, and later a small gauze strip was taken from the sinus. Suit was entered for $10,000.

Dr. Wiggin contended that the gauze was not the kind he used in sponging, and that the small strip had probably been left in the sinus while the patient was being dressed at the other institution. Verdict for the defendant.

Lawsuit. Small Gauze Sponge Removed by Secondary Operation.—The patient was operated on for appendicitis by Gillette. After the abdomen was open it was found that the trouble was tubal pregnancy. The appendix incision was closed and a median incision made, and through that the operation was completed. About four days after the operation the appendix incision began to discharge pus. Gillette treated this sinus persistently under the impression that it was kept up by unabsorbed kangaroo tendon, which might at any time be wholly absorbed and thus permi months of this treatment the patient went to another physicia after the first operation, did a secondary operation and found a which the patient recovered. Suit was entered for $5,000.

In the trial court the verdict was for the defendant on th of action, if any arose, was barred by the statute of limitation. that the trial court was in error and reversed the decision. divided equally on the subject, hence the decision of the Circ stand—verdict for the plaintiff.

Lawsuit. Sponge Left in Abdomen.—Baldwin was made def question that assumed much importance in the case was as t bility for the count of the sponges lay with the surgeon or wit

The suit against the surgeon was finally withdrawn, and against the hospital where the operation occurred.

Lawsuit. Sponge Removed at Secondary Operation.—The p for an abdominal tumor by Thorne. Several months later a seco formed by another surgeon and a sponge was found in the patient recovered. Legal proceedings were begun against the Thorne) on the ground that she was guilty of negligence in the sponges used in the course of the operation before the wou

The defendant denied negligence and held that the leaving o dent that could not always be avoided. She further said that, other operating surgeons, she left the counting of the sponges considering that it was the duty of the surgeon to keep his upon the patient until the wound had been closed.

The judge, in summing up the case, said there was no d was a skillful surgeon, but the question in this case was whether she had been guilty of want of reasonable care. were: (1) whether the defendant was guilty of want of reas or superintending the counting of the sponges; (2) whether t by the defendant and under her control during the operation; was guilty of negligence in counting the sponges; and (4) the sponges was a vital part of the operation which the defe properly performed.

After lengthy consideration the jury returned a verdict for t

Criminal Trial. Sponge Found at Autopsy. The patient w tory laparotomy by d'Antona. A carcinoma of the liver was fo prognosis given. The patient recovered from the immediate but died after a month. At the autopsy a gauze pad, 70 by also two liters of pus. The physicians who made the post-m out a statement to the effect that the death was due to the and the peritonitis and secondary pleuritis resulting therefrom. then had d'Antona indicted and placed on trial for criminal

The verdict was that the patient would have died from th The prosecutor then claimed that the hospital records had new trial was granted. In the second trial ten experts we testified that there was sufficient cause for death outside the sponge within the abdomen might have had. The trial because of the absence of prosecuting evidence.

This case was reported by Prof. Pio Foa, who stated that, conducted by competent pathologists, such an erroneous repor made, and the unfortunate trials would not have occurred.

Lawsuit. Sponge Left in Abdomen. The patient was subject by Schooler. Later developments indicated that a sponge, had been left in the abdomen. Suit was entered for $1,500.

Lawsuit. Sponge Left in Abdomen. The husband of the plaintiff was operated on for appendicitis by Hageboeck. It was charged that a surgeon's sponge had been left in the abdomen and that this caused an abscess which resulted in death. Suit was entered for $50,000.

In two trials the jury disagreed. It was reported that in each trial the jurors stood 11 to 1 in favor of the plaintiff. The case was to come up for a third trial the latter part of the year.

Criminal Trial. Forceps Found in Abdominal Cavity at Autopsy. A patient with a large fibroid was operated on by Lassallette. Death occurred a few hours after the operation. Autopsy disclosed a forceps in the peritoneal cavity.

At the trial the operator was condemned to two months in prison for homicide through negligence. The sentence was served.

After serving the sentence, Lassallette put in a plea that the patient's death had not been caused by the retention of the instrument, but by nux vomica. The death occurred too soon to have been due to the presence of the instrument. It was proven that a midwife of bad reputation had a bottle of nux vomica in her hand at the house on the day of the death. This was an entirely new phase. The body was exhumed. Lassallette was acquitted.

Criminal Trial. Two Artery Forceps Found in Abdomen at Secondary Operation. The patient was operated on for ovarian cyst, Dec. 22, 1897, by Prof. Kosinski and Dr. Solman, in the latter's private hospital. After a few days there appeared fever and a mass, which continued. In the meantime two artery forceps had been missed, and it was thought they might be in the abdomen. The disturbance persisted, and six weeks after the operation the abdomen was reopened and the mass of exudate investigated, but neither forceps nor pus was found. The patient was better afterward and went home, but did not get well. Later a hard mass developed near the umbilicus. Kosinski still thought the forceps might be in the abdomen, and insisted on another operation and offered to perform it gratis. But the sons would not hear to this, and the patient was taken to several other physicians, one after another, hoping to be cured without operation. Finally, six months after the primary operation, the symptoms became acute and threatening, and the physician who was called in insisted that the patient be taken to Kosinski at once, that he might perform the operation, which had then become imperative. This the family refused to do and called in another physician, who operated. On opening into the mass at the pelvic brim he found a cavity in which lay the two artery forceps. Both forceps had forced an entrance into the external iliac artery. The removal of the forceps was attended with a furious hemorrhage, from which the patient died on the table.

Legal action was entered against Kosinski and there was an extensive trial, with an imposing array of legal and medical talent. Six experts were appointed to testify in the case—Przewoski and Troichij to consider the pathologico-anatomical features, Krajewski to describe a modern laparotomy, Maksimow to criticise the operation as performed in this case, Pawlow to consider the various complications and mistakes that may occur in a laparotomy, and Neugebauer to supply the statistics which might be required in the trial. It was for use in this trial that Neugebauer compiled the list of cases that he published the following year (1900), which publication has done so much to enlighten the profession on this subject.

The trial resulted in the acquittal of the accused as far as causing the death of the patient was concerned—it having been shown that he strongly insisted on a line of treatment which would probably have prevented the patient's death had the treatment not been peremptorily rejected by the family.

A curious clinical feature of this case was that, during the patient's illness, a number of radiographs of the suspicious area were made, but not one of them showed the forceps—the failure being due doubtless to defective technique.

Lawsuit. Artery Forceps Extracted From a Sinus. The patient was subjected to operation for a sarcomatous growth in the abdominal wall by Dollinger. The patient was three months pregnant at the time of the operation. She recovered from the operation and was delivered at term without any special disturbance. She became pregnant again. Her health was excellent and she was able to do all her housework. In the latter part of the pregnancy there appeared in the operative scar a swelling, which opened and discharged much offensive pus. The abscess was still further opened by the family physician. Within a few days she was delivered. A few days after the delivery an artery forceps was discovered in the abscess wall. The patient was sent to the hospital and the forceps removed by operation. The patient died two days later.

The husband of the patient demanded money of Dollinger, which demand was refused. He then went to the public prosecutor and endeavored to have a criminal prosecution brought against the surgeon. The prosecutor asked Dollinger for a written statement of the case, which was given. The prosecutor saw no evidence to warrant criminal proceedings, and dropped the matter.

The husband then brought civil suit, and for thirteen months Dollinger spent all his time defending himself. Sensational reports appeared in the public press, and it is said that the comic papers made capital of it and pamphlets on the subject were sold at the cigar stands. Though acquitted, Dollinger suffered irreparable damage from the sensational newspaper reports and the consequent notoriety. He urges strongly that some means should be provided by which reputable physicians may protect themselves from this species of blackmail and newspaper persecution.

Criminal Trial. Piece of an Instrument Left in Abdomen. A Paris surgeon lost part of a broken instrument in the abdominal cavity. The patient died. The surgeon was put on trial for manslaughter due to negligence. Result of trial not stated.

Lawsuit. Pair of Spectacles Found in Abdominal Cavity. The patient had three operations—the first in America, the second in Germany and the third in France. The French surgeon found a pair of spectacles in the abdomen. The patient sought redress in the courts.

The outcome of the trial is not given, neither is it stated definitely who was sued. Neugebauer, who cites the case, blames the German surgeon—noting that he either left the spectacles himself or missed finding them if left by the previous operator.

Lawsuit Threatened. Gauze Compress Discharged Per Rectum. The patient had jected to vaginal section, for pelvic suppuration, by MacLaren. It was a very severe case. There was persistent bleeding requiring packing, and there were two secondary hemorrhages requiring repeated packing. The patient recovered. Two months afterward a very offensive discharge appeared and the patient extracted a twelve-inch strip of iodoform gauze from the vagina.

Suit was threatened and, on the advice of his attorney, MacLaren paid the patient a considerable sum to avoid further proceedings.

Lawsuit Threatened. Gauze Compress Discharged Per Rectum. The patient had uterine fibroids, which Borysowicz removed by abdominal operation. Three weeks later a gauze compress was passed per rectum. Evidently the compress had been left in the peritoneal cavity at the time of the operation. The patient recovered and thanked the operator most gratefully for his services and left him her photograph. Six years later he received a number of letters from the patient's husband, threatening prosecution for malpractice if he did not at once pay a certain sum. The husband had no doubt heard of a lawsuit (Kosinski's?) then on at Warsaw, and thought it an easy way to obtain some money from Borysowicz. Apparently nothing came of the effort.

Lawsuit Threatened. Forceps Alleged to Have Been Passed Per Rectum. The patient was operated on for a suppurating ovarian cyst by Tuholske. It was an extremely severe case, but the patient recovered and regained her health rapidly. Twenty months later she wrote that she had given birth to a fine baby and felt well.

Labor had been uncomplicated. The account continues: "Some five or six months after that (more than two years after the operation) the husband called on me and stated that for two or three months his wife had had some rectal trouble, supposed to be piles, and that a week ago, under considerable suffering, she had passed a forceps at stool. He brought it to me; it was a forceps such as is usually carried as dressing forceps in a pocket case—not a hemostat. I did not claim ownership. At any rate, if that forcep had been in the pelvis for two and a half years, during pregnancy and labor, without giving rise to a symptom or modifying labor, it was a remarkable occurrence. Three months after this episode the patient was reported well." In a later reference to the case, Tuholske stated that several demands were made for money, accompanied by threats of a suit. No attention was paid to the demands and finally they ceased. He expressed the opinion that it was an attempt to obtain money by blackmail.

The Question of Deception, Intentional or Otherwise. The repeated occurrence of this accident in the past and the possibility of its occurrence at any time gives an opportunity for designing persons to obtain money under false pretenses. Neugebauer calls attention to this fact, and remarks that, following the newspaper publicity given the Kosinski trial, a number of damage suits, alleging the accident, were filed, and that in most instances they were cases of blackmail or extortion.

A case has been reported of a patient who, following convalescence from an abdominal operation, expelled pieces of gauze or thin cloth from the mouth. The patient claimed that the expelled pieces were vomited sponges, which had worked their way into the stomach from the peritoneal cavity. Suit was threatened. The matter was dropped, however, when the practical impossibility of the occurrence, as detailed, was explained to the patient.

When discussing the subject of foreign bodies left in the abdominal cavity, a physician related to me some of the details of a case in which he had been involved. He performed an abdominal operation, and, some time following the convalescence, the patient came to him and exhibited a surgical needle and stated that the needle had been passed per rectum. The patient's statement was confirmed by a physician who claimed to have treated him at the time the needle was passed. Suit was threatened. On examination of the needle the operator found it was not the kind he used at the operation, and he became convinced that the alleged occurrence was an attempt at blackmail.

The matter dragged along for some time. The operator accumulated all the information he could concerning the subject and concerning the parties involved, and finally confronted them in such a way that they were forced to make a written statement, acknowledging that the needle had not been passed per rectum, as alleged. The needle exhibited had been obtained elsewhere for the purpose of threatening suit and extorting money.

Porter gives an account of a peculiar case bearing on this subject. The operation was for a parovarian cyst and hydrosalpinx and chronic appendicitis. The convalescence was normal and the patient left the hospital twenty-two days after the operation, feeling well. Eight days later, Porter received a telephone message from the patient's family physician, stating that he had removed several pieces of gauze from her vagina.

Quoting from the report, "On inquiry from him I learned that the pieces did not tear off, but came away, or rather were removed with forceps, in the shape of rolls about the length and size of a lead-pencil, and after all presenting were removed others would present in a few hours, requiring that he visit her two or three times a day to take them away. The doctor thought that the pieces came from the pelvic cavity through an opening in the right side of the vagina about the size of a lead-pencil.

"On the next day but one after learning of the matter, I visited the patient at her home with her doctor, and found the patient on a cot apparently suffering some pain,

which she said was due to more pieces 'coming down.' She did
to my question she said she felt well until she got a jolt
home and that since then she had been having pain, whic
and had not been so severe since the pieces began to come aw
the doctor had of the nature of the trouble came through the
told him that there was a piece of gauze protruding from the
what had been removed and was shown a large number of pi
whereupon I remarked that the goods were not such as I ha
there were more pieces than had been used all told in the op
quently they had not been left in the woman's belly by me. I
could get into her belly only through the wound made by me
made, because it had been closed, healed by first intention, an
patient facetiously remarked that she 'supposed she swallowe
'had you swallowed them they would not come out through the

"Dr. F. now asked the patient if she thought more 'piec
answered in the affirmative, he introduced a speculum and fo
I removed the speculum, and, introducing my finger, came upo
thing which, upon removal, proved to be a piece of ordinary w
inches wide by seven inches long, twisted into a rope and dou
make a small ball or wad. It was perfectly clean, and was so sat
and smelled like urine that on squeezing between the fingers sev
out. I examined the vagina with my finger, assuring myself t
'pieces' there, that there was no hole leading into the pelvic
it was a perfectly healthy vagina and in nowise unusual ex
which, of course, the frequent wipings it received were account

"In the presence of the patient, her mother-in-law and the do
finger at the patient, 'Doctor, I don't know where those rag
woman knows very well, and could tell if she would.' The
to my statement rather forcibly, but the patient said nothing.
outside, told him that the woman was a malingerer and tha
chance to put some more rags in for removal. We received
we left. Before leaving I insisted upon both the doctor and m
inspection of the vagina with the eye and the finger as well.
abnormality was found. It should be stated that some of the '
blood, but none of those removed during my visit were so tin

Dr. Porter exhibited ten pieces of different size, shape and

"Eight days after my visit, Dr. Fisher reported 'no more exhib
no threat was made of a suit for damages, nor did the patie
out of humor with me. The husband was at work and not p
although he presumably knew the day before that I was to
word that I was coming."

In regard to the possible cause for the deception, Dr. Porte
for money; 2, desire for sympathy; 3, desire to avoid work; 4
stated that during the patient's stay in the hospital nothing poi
dition was noted. Indeed, she was regarded as an unusually nic

Schaefer gives the details of a case which emphasizes the
of gauze is found in the abdominal cavity it does not necess
left there in a previous operation. The case occurred in the
Jones was called to see a woman with an abdominal swelli
an abscess, which was opened and discharged a piece of clo

There had been no previous operation. The woman was i
the habit of tearing up pieces of cloth and swallowing them
had evidently caused ulceration of the stomach wall, with sub
the peritoneal cavity.

The noted intestinal "hair-balls," requiring operation, constitute another class of foreign bodies in the abdomen which were not left there by the surgeon.

Again, the professional "knife swallowers" and "glass eaters" and their amateur imitators must be kept in mind. Fortunately the menu of these persons is limited, as a rule, to household articles. However, some such "actor," who has been relieved of his accumulated load by surgical art, might, from the intimate acquaintance, acquire a taste for surgical forceps instead of the usual nails and pocket-knives. In that case a condition might easily develop that would make it very uncomfortable for the previous operator, though wholly without fault on his part.

To make absolutely certain that no sponge or other foreign body is left in the peritoneal cavity at operation is a hard problem. The solution of this problem is considered on pages 928-933.

OTHER CONDITIONS

Presenting Medico-Legal Points.

1. The various medico-legal questions concerned with the state of pregnancy, abortion, labor and the puerperium belong more strictly to obstetrics, and need not be considered here.

2. The question of the character of a disease present—particularly gonorrhoea, syphilis, or chancroid—and the source from which it could have come, and whether or not it is still transmissible, are all questions that may assume medico-legal importance under various circumstances; for example, in suits for divorce, suits for possession of children, suits for alimony, suits for damages against individuals or corporations, etc. Of injuries, also, of the genital organs you may be called to give the nature, extent, possible cause and probable outcome. All these are simple clinical questions, and the information regarding them may be obtained from the clinical portions of this work.

3. Various questions in regard to sterility may come up in legal inquiries. The required information on this subject is given in Chapter XIV.

4. In the case of the death of a woman or girl under suspicious circumstances, the physician may be called upon to make a post-mortem examination and then to answer, as far as possible, various questions, among which may be the following:

What pelvic lesions were present?
What was the probable cause of these lesions?
What was the cause of death?

5. In coroner's cases, and much more so in malpractice suits (before or after death), the following questions may be asked concerning almost any gynecological disease:

What disease is present?
What are the principal points upon which your diagnosis is based?
In your opinion did the attending physician use reasonable care and skill in the diagnosis?
What is the established treatment for the disease?
In your opinion did the attending physician use reasonable care and skill in the treatment?

6. In criminal cases and in damage suits the physician testifying as an expert may be required, particularly in the cross-examination, to explain in detail various points in the etiology, pathology, symptomatology, diagnosis, treatment and prognosis of the affection under consideration. To answer such questions, the physician must be well grounded in all the important facts and theories of the disease, and must be able to give the required explanations in a few words and in ordinary language, avoiding the little-understood technical terms.

On important contested points it is well to be fortified with the names of two or three recognized authorities on that particular subject, with their exact statements. This information is, of course, held in reserve, to be given only if requested.

APPENDIX.

FORMULÆ.

The formulae may be classed in two groups—those for internal use and those for local use.

FOR INTERNAL USE.

The various classes of remedies commonly used internally (by mouth or hypodermatically) in gynecological cases are cathartics, emmenagogues, sedatives, stimulants, styptics and tonics.

CATHARTICS.

Gm.
or
c.c.

℞ Sodii et Potas. Tartrat., 60. (℥ij.)
(Rochelle Salt)

Sig. One to three teaspoonfuls in a glass of water, each morning an hour before breakfast.

[Used especially in acute inflammatory conditions in the pelvis.]

℞ Fl. Ext. Rhamni Pursh.
Aromat., 60. (℥ij.)

Sig. Fifteen to thirty drops each night at bedtime.

[Used as a tonic laxative in cases complicated by chronic constipation. Increase the daily dose to a teaspoonful if necessary.]

Gm.
or
c.c.

℞ Pil. Aloin. Belladonna.
Strychnia. and Cascara.
(P. D. & Co.)

Sig. One pill each night, or each night and morning if necessary.

[Used as a tonic laxative in chronic constipation. Each pill contains aloin 1/5 gr., strychnia 1/60 gr., extract of belladonna ⅛ gr., and extract of cascara sagrada ½ gr.)

℞ Sodii Phosphat.
Gran. Effervesc., 120. (℥iv.)

Sig. Teaspoonful in a glass of water, one to two hours after each meal.

[A mild laxative, especially useful in cases complicated by liver disease or chronic gastroduodenitis.]

EMMENAGOGUES.

℞ Manganes. Dioxid., 4. (ʒi.)
Div. Pil. No. xxx.

Sig One pill three times daily.

[May increase the dose to two and three and even four pills, if no disturbance is noticed.]

℞ Apiolini, 6. (ʒiss.)
Div. Caps. No. xxx.

Sig. One capsule three times daily, after meals.

℞ Quin. Sulphat. 4.00 (ʒi.)
Ext. Nucis Vomic., 0.50 (gr. viii.)
Olei Sabinae, 1.00 (gr. xv.)
Aloes Socotrin., 0.30 (gr. v.)
Cantharidis, 1.00 (gr xv.)
Div. Pil. No. xxx.

Sig. One pill three times daily.

SEDATIVES.

Dysmenorrhoea Mixture.

Gm.

℞ Potas. Bromid., 5. (ʒi.)
Elixir of Guarana and Celery, 120. (℥iv.)

Sig. Two teaspoonfuls every 4 hours when in pain.

℞ Fl. Ext. Viburn Prunifol., 120. (℥iv.)

Sig. Teaspoonful every four to six hours.

℞ Liquor Sedans, 120. (℥iv.)
(P. D. & Co.)

Sig. Teaspoonful every four to six hours.

[The Liquor Sedans is more agreeable than the plain viburnum and also more effective. Each ounce contains viburnum prunifol. 30 gr., hydrastis 60 gr., Jamaica dogwood 30 gr., and cascara sagrada, 40 gr.]

	Gm. or c.c.
℞ Sod. Bromid.,	15. (ʒiv.)
Ess. Pepsin.,	30. (℥i.)
Aquae,	q. s. ad 60. (℥ii)

Sig. Teaspoonful in sarsaparilla soda-water, when sleepless, and repeat after three hours as necessary.

℞ Sulphonal.,	4. (ʒi.)

Div. Chart. No. iv.

Sig. One powder in a glass of hot lemonade at 10 p. m., when sleepless.

℞ Phenacetin.,	2. (ʒss)
Codein. Phosphat.,	0.18 (gr. iii.)
Caffein. Citrat.,	0.18 (gr. iii.)

Div. Caps. No. vii.

Sig. One capsule when pain is severe, and repeat after three hours as necessary.

	Gm. or c.c.
℞ Fl. Ext. Hyoscyami,	6. (ʒiss.)
Potas. Citrat.,	10. (ʒiiss)
Fl. Ext. Zeae,	60. (℥ii.)
Aquae,	q. s. ad 120 (℥iv.)

Sig. Teaspoonful in sarsaparilla soda-water, every three to six hours as ordered.

[Used to relieve vesical tenesmus.]

℞ Acid. Benzoic.,	6. (ʒiss)
Sodii Borat.,	8. (ʒii.)
Aquae,	240. (℥viii.)

Sig. Tablespoonful in water three times daily. In four days reduce the dose to a teaspoonful.

[Used when there is a tendency to phosphatic deposits from the urine, especially in cases of vesico-vaginal fistula.]

STIMULANTS.

STRYCHNIA SULPHATE, 1/30 gr. hypodermatically or by mouth, every four to eight hours.

DIGITALIN, 1/50 gr. hypodermatically or by mouth, every two hours when pulse is rapid and weak.

NORMAL SALINE SOLUTION (8/10%), given intravenously or subcutaneously or in the open abdomen or per rectum.

This is useful in all conditions of shock. It is especially effective in shock due to loss of blood (after the bleeding is stopped).

If the patient is nearly pulseless, the empty vessels may be at once filled by intravenous injection, using a pint to a pint and a half (not more at one time), at a temperature of 100° F.

When the case is not so urgent but still a quick effect is desired, the saline solution is given subcutaneously, one to two pints under the skin on each side of the chest.

If the abdomen is open, the peritoneal cavity may be filled with hot saline solution, provided there is no contra-indication such as a focus of pus which might be thus disseminated.

For less urgent shock and for stimulating kidney action, the warm saline solution is used as high enemata, one pint or more every four to twelve hours.

In acute septic cases, continuous rectal absorption is secured by allowing the tepid saline solution to flow into the rectum very slowly — drop by drop, as explained on p. 697.

OXYGEN is a useful stimulant when respiration is shallow or when there are lung complications. It is administered by attaching a tube, with a face-piece and water filter, to the iron jar containing the oxygen.

STYPTICS.

℞ Ergotin. (Merck),	2. (ʒss.)
Ext. Nucis Vomic.,	0.36 (gr. vi.)

Div. Caps. No. xxx.

Sig. One capsule every six hours.

[Used in hemorrhagic conditions not connected with pregnancy.]

℞ Ergotin.,	2. (ʒss.)
Ext. Nucis Vomic.,	0.36 (gr. vi.)
Ext. Cannab. Indic.,	0.60 (gr. x.)

Div. Caps. No. xxx.

Sig. One capsule every six hours.

[Used when tnere is associated pain, particularly of neuralgic character.]

℞ Stypticin.,	4. (ʒi.)

Div. Caps. No. xxx.

Sig. One capsule every six hours, when bleeding is present.

[This is an excellent anti-hemorrhagic remedy, but it is so expensive that some patients object to it. In cases where it is desired to give a styptic for some months, the ergotin capsules may be given continuously and the stypticin capsules added during menstruation.]

℞ Ergotin.,	2. (ʒss.)
Stypticin.,	2. (ʒss.)
Hydrastinin,	2. (ʒss.)

Div. Caps. No. xxx.

Sig. One capsule every six hours, when bleeding is present.

℞ Fl. Ext. Ergot.,	60. (℥ii.)

Sig. Half teaspoonful every four to twelve hours, when bleeding is present.

℞ Desic. Thyroid.,	6. (ʒiss.)

Div. Caps. No. xxx.

Sig. One capsule three times daily.

	Gm. or c.c.
℞ Calcii Chlorid.,	20. (ʒv.)
Elix. Simpl.,	30. (℥i.)
Aquae,	q. s. ad 120. (℥iv.)

Sig. Teaspoonful in water three times daily.

[Used in hemorrhagic conditions, to increase the coagulability of the blood.]

	Gm. or c.c.
℞ Adrenalin, 1-1000 solution,	15. (℥ss.)

Sig. Fifteen drops in water every three hours till bleeding ceases.

TONICS.

℞ Tinct. Ferri Chlorid.,	30. (℥i.)

Sig. Ten drops in a capsule, followed by half a glass of water, three times daily.

℞ Elix. Iron., Quinin., and Strychnin.,	120. (℥iv.)

Sig. Teaspoonful in half a glass of water three times daily, before meals.

℞ Strychnin. Nitrat.,	0.06 (gr. i.)
Massae Ferri Carbonat.,	6.00 (ʒiss.)
Quinin. Sulphat.,	4.00 (ʒi.)

Div. Caps. No. xxx.

Sig. One capsule three times daily, after meals.

℞ Liq. Potas. Arsenitis,	10. (ʒiiss)
Syr. Ferri Iodid.,	60. (℥ii.)

Sig. Ten drops in water three times daily Increase to twenty drops, as directed.

℞ Hydrarg. Bichlorid.,	0.09 (gr. iss.)
Tr. Ferri Chlorid.,	10.00 (ʒiiss.)
Liq. Acid. Arseniosi,	10.00 (ʒiiss.)
Acid. Hydrochlor. dil.,	20.00 (ʒv.)
Syrup. Simpl.,	120.00 (℥iv.)

Sig Teaspoonful in water three times daily, after meals.

[This mixture is known as the "Four Chlorides" and is a very effective tonic in cases complicated by anemia and neuroses.

FOR LOCAL USE.

The various preparations used locally in gynecological cases are ointments, powders, solutions, suppositories and tablets.

OINTMENTS.

Antiseptic Ointments.

Carbolized Vaseline, 1%
Carbolized Zinc Oxide Ointment, 1%.
Unguentum Crede.

℞ Hydrarg. Bichlorid.,	0.15 (gr. iiss.)
Lanolin.,	15.00 (ʒiv.)
Ungt. Aq. Rosae,	30.00 (℥i.)

Sig. Apply locally, but not to mucous membranes.

Anti-parasitic Ointments.

℞ Sulphur. Precip.,	4.00 (ʒi.)
Vaselini,	30.00 (℥i.)
Olei Rosae,	q. s.

Sig. Apply as directed twice daily.

Kapozi's Petroleum Salve.

℞ Petrolati,	25. (ʒvi.)
Olei Olivae,	10. (ʒiiss.)
Balsam. Peru.,	5. (ʒi.)

Sig. Apply as directed twice daily.

Sedative Ointments.

(Protective, Anti-pruritic, Anesthetic).

Zinc Oxide Ointment.
Vaseline.
Ungt. Aquae Rosae.

℞ Zinci Oxidi,	8. (ʒii.)
Acidi Carbolici,	1. (♏xv.)
Lanolin.,	30. (℥i.)
Ungt Aq. Rosae, q. s. ad	60. (℥ii.)

Sig. Apply several times daily.

℞ Zinci Oxidi,	2. (ʒss.)
Bismuth. subcarbonat.,	2. (ʒss.)
Acidi Carbolici	0.60 (♏x.)
Vaselini,	30. (℥i.)

Sig. Apply as directed.

℞ Mentholis,	4. (ʒi.)
Olei Olivae,	8. (ʒii.)
Chloroform.,	2. (ʒss.)
Lanolin,	30. (℥i.)

Sig. Apply two or three times daily.

℞ Acid. Salicylici,	1.00 (gr. xv.)
Creosoti,	1.30 (♏xx.)
Glycerit. Amyli.,	45.00 (℥iss.)
Lanolin.,	15.00 (ʒiv.)

Sig. Apply two or three times daily.

℞ Acid. Carbolici,	1.00 (♏xv.)
Hydrarg. Sulphid. Rubri.,	0.50 (gr. ix.)
Sulphur Sublimat,	45.00 (℥iss.)
Olei Bergam.,	1.00 (♏xv.)

Sig. Apply as directed.

	Gm. or c.c.	
℞ Acidi Carbolici,	0.30	(♏v.)
Bismuth. Subnitrat.	2.00	(ʒss.)
Ungt. Hydrarg. Ammoniat.,	8.00	(ʒii.)
Ungt. Aq. Rosae,	15.00	(℥ss.)

Sig. Apply as directed.

LASSAR'S PASTE.

℞ Sulphur. Sublim.,	4.00	(ʒi.)
Zinci Oxidi,	4.00	(ʒi.)
Amyli,	4.00	(ʒi.)
Acid. Salicylic.,	0.60	(gr. x.)
Vaselini,	30.00	(℥i.)

Sig. Apply as directed.

℞ Chloreton.,	4.00	(ʒi.)
Ungt. Aq. Rosae,	30.00	(℥i.)

Sig. Apply as directed.

℞ Orthoform.,	4.00	(ʒi.)
Ungt. Aq. Rosae,	30.00	(℥i.)

Sig. Apply as directed.

℞ Cocaine Hydrochlor.,	1.00	(gr. xv.)
Ungt. Aq. Rosae,	15.00	(℥ss.)

Sig. Apply as directed.

Stimulating Ointments.

	Gm. or c.c.	
℞ Ungt. Picis Liq.,	4.00	(ʒi.)
Zinci Oxidi,	4.00	(ʒi.)
Ungt. Aq. Rosae,	8.00	(ʒii.)
Lanolin.,	15.00	(℥ss.)

Sig. Apply on strips of muslin as directed.

WILKINSON'S OINTMENT.

℞ Sulphur. Precip.,	10.00	(ʒiiss.)
Picis Liquid.,	10.00	(ʒiiss.)
Saponis Virid.,	10.00	(ʒiiss.)
Terrae Albae,	6.00	(ʒiss.)
Adepis,	15.00	(℥i.)

Sig. Apply as directed.

℞ Resorcin.,	2.00	(ʒss.)
Acid. Salicylic.,	0.36	(gr vi.)
Vaselini Flav.,	30.00	(℥i.)

Sig. Apply as directed.

℞ Ungt. Hydrargyri,	10.00	(ʒiiss.)
Ungt. Belladonnae,	10.00	(ʒiiss.)
Ungt. Iodi Comp.,	10.00	(ʒiiss.)

Sig. Apply under pressure bandage.

POWDERS.

Antiseptic and Drying Powders.

PULV. BORIC ACID, dusted on freely as directed.

ARISTOL, dusted on as directed.

℞ Xeroform,,	6.00	(ʒiss.)
Acid. Boric.,	30.00	(℥i.)

Sig. Apply as directed.

℞ Acid. Tannic.,	4.00	(ʒi.)
Xeroform.,	6.00	(ʒiss.)
Acid. Boric.,	30.00	(℥i.)

Sig Apply as directed.
[Astringent and antiseptic.]

℞ Zinci Oxidi,	15.00	(℥ss.)
Magnes. Carbonat.,	15.00	(℥ss.)
Salolis,	15.00	(℥ss.)
Amyli,	15.00	(℥ss.)

Sig. Apply as directed.

℞ Comp. Stearat. of Zinc with Balsam Peru., (McK. & R.)	30.	(℥i.)

Sig. Use as a dusting powder.

[A pleasant and effective drying powder which will turn water to some extent.]

℞ Acid. Salicylic.,	0.24	(gr. iv.)
Acid. Boric.,	30.00	(℥i.)
Iodoform.,	8.00	(ʒii.)
Ess. Eucalyp.,	q. s.	

Sig. Apply freely on the affected surface several times daily.

[Used to check the odor of sloughing tissue, as in malignant disease.]

Sedative Powders.

℞ Anesthesin.,	4.00	(ʒi.)
Acid. Boric.,	30.00	(℥i.)

Sig. Apply as directed.

℞ Chloreton.,	4.00	(ʒi.)
Acid. Boric.,	30.00	(℥i.)

Sig. Apply as directed.

℞ Orthoform.,	4.00	(ʒi.)
Acid. Boric.,	30.00	(℥i.)

Sig. Apply as directed.

℞ Morphia. Sulphat.,	2.00	(ʒss.)
Cretae Prep.,	4.00	(ʒi.)

Sig. Apply twice daily as directed.

SOLUTIONS.

Douche Solutions.

℞ Hydrarg. Bichlorid.,	6.00	(ʒiss.)
Ammon. Chlorid.,	6.00	(ʒiss.)
Methylene Blue.,	0.001	(gr. $\frac{1}{60}$)
Aquae, q. s. ad	240.00	(℥viii.)

Sig. For External Use. Tablespoonful to two quarts of hot water. Use as directed.

℞ Acidi Carbolici,	120.00	(℥iv.)
Glycerini, q. s. ad	240.00	(℥viii.)

Sig. For External Use. Tablespoonful to two quarts of hot water. Use as directed.

℞ Lysol.,	240.00	(℥viii.)

Sig. For External Use. Tablespoonful to two quarts of hot water.

		Gm. or c.c.	
℞	Potas. Permanganat.,	10.00	(ʒiiss.)
	Aquae,	240.00	(℥viii.)

Sig. For External Use. Tablespoonful to two quarts of hot water.

℞	Pulv. Aluminum. Acetat.,	60.00	(℥ii.)

Sig. Teaspoonful of the powder dissolved in two quarts of hot water. Use as directed.

℞	Formol.,	30.00	(℥i.)

Sig. POISON. For External Use. Five drops to two quarts of hot water. Use as directed.

℞	Zinci Sulphat.,	15.00	(℥ss.)
	Alum.,	60.00	(℥ii.)

Div. Chart. No. xv.

Sig. One powder dissolved in one quart of water.

[A strong astringent douche.]

℞	Acidi Tannici,	30.00	(℥i.)
	Glycerini,	240.00	(℥viii.)

Sig. For External Use. Tablespoonful in one quart of water.

[A strong astringent douche.]

Sedative Solutions.

LEAD AND OPIUM WASH.

℞	Liq. Plumbi Subacetat.,	30.00	(℥i.)
	Tinct. Opii.,	60.00	(℥ii.)
	Aquae,	q. s. ad 240.00	(℥viii.)

Sig. For External Use. Apply as a lotion as directed.

ALUM AND LEAD LOTION.

℞	Pulv. Alum.,	2.	(ʒss.)
	Sol. Plumbi Subacetat.,	2.	(ʒss.)
	Aquae,	q. s. ad 240.	(℥viii.)

Sig. Apply on compresses under pressure bandage.

℞	Zinci Sulphat.,	0.24	(gr. iv.)
	Fl. Ext. Hydrastis,	30.00	(℥i.)
	Aquae,	q. s. ad 120.00	(℥iv.)

Sig. For External Use.

CALAMINE LOTION.

℞	Zinci Oxidi,	15.00	(℥ss.)
	Pulv. Calamin. Prep.,	6.00	(ʒiss.)
	Glycerini,	30.00	(℥i.)
	Liq. Calcis,	q. s. ad 240.00	(℥viii.)

Sig. For External Use.

Gm. or c.c.

Anesthetic Solutions.

COCAINE HYDROCHLORATE, 4% to 20% solutions for local applications, and ½% to 4% for subcutaneous injection.

EUCAINE HYDROCHLOR. B., same as cocaine for subcutaneous use. It is less toxic than cocaine, and, furthermore, the solution can be sterilized by boiling.

℞	Eucain. Hydrochlor. B.,	0.10	(gr. iss.)
	Morphia. Hydrochlor.,	0.025	(gr. ss.)
	Sodii Chlorid.,	0.20	(gr. iii.)
	Aquae Distil.,	100.00	(℥iiiss.)

Sig. Schleich Solution, No. 2.

[For producing local anesthesia by the infiltration method. Sterilize the solution by boiling immediately before use.]

Miscellaneous Solutions.

℞	Ext. Cannabis Indic.,	0.60	(gr. x.)
	Acidi Salicylic.,	1.30	(gr. xx.)
	Alcohol.,	1.30	(♏ xx.)
	Ether.,	1.30	(♏ xx.)
	Collodion.,	q. s. ad 30.00	(℥i.)

Sig. For External Use. Apply as directed twice daily.

[For use on dry warts (not the ordinary condylomata) occurring about the external genitals].

KAISERLING SOLUTIONS.

The preservation of specimens by the Kaiserling method, so that they retain the natural colors, consists of the following three steps.

Step 1. Fix for one to five days (according to the size of the specimen) in the dark, in the following solution:—

Potassium Nitrate,	15.00	(℥ss.)
Potassium Acetate,	30.00	(℥i.)
Formol (40% sol. of formaldehyde gas),	200.00	(℥viss.)
Aquae,	1000.00	(℥xxxiiiss.)

Step 2. Then place the specimen in 80% Alcohol for one to six hours and then in 95% Alcohol for one or two hours. This treatment with Alcohol brings back the original colors to the specimen.

Step 3. Then preserve the specimen in the dark, in the following solution:

Potassium Acetate,	200.00	(℥viss.)
Glycerine,	400.00	(℥xiiiss)
Aquae,	2000.00	(℥lxviss.)

SUPPOSITORIES.

℞	Cocain. Hydrochlor.,	0.18	(gr. iii.)
	Olei Theobrom.,	q. s.	

Div. Suppositor. No. VI.

Sig. For External Use. Use as directed.

[To be used within the vagina.]

Also, various manufacturing firms put up glycerin-gelatin suppositories with different medicines incorporated, such as protargol, hydrastis, ichthyol and various combinations.

TABLETS.

Different manufacturing houses put on the market compressed tablets for vaginal use, containing a great variety of drugs and combinations. By looking over the lists one can find almost any formula desired.

INDEX.

DIAGNOSTIC, THERAPEUTIC AND GENERAL INDEX.

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